INSTRUCTION MANUAL

FOR

TYPES VT-30C AND SVT-30C

TUNERS

COMMUNICATION ELECTRONICS, INC.

6006 EXECUTIVE BOULEVARD ROCKVILLE, MARYLAND, 20852

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G/200/10/11/66

WARNING

This equipment employs voltages which are dangerous and may be fatal if contacted. Extreme caution should be exercised in working with the equipment with any of the protective covers removed.

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Table 1-1. Types VT-30C and SVT-30C Tuner Specifications

Types of Receptions	AM, FM, CW, and Pulse
Frequency Range	30 to 260 mc in two bands: Band A: 30-60 mc Band B: 54-260 mc
Input Impedance	50 ohms; Nominal
Noise Figure	Band A: 6.5 dB maximum Band B: 6.5 dB maximum
Image Rejection	50 dB, minimum
IF Rejection	Band A: 40 dB, minimum Band B: 50 dB, minimum
Nominal Gain	33 dB (below AGC threshold)
Gain Variation with Tuning	6 dB, maximum
Over-all Bandwidth	3.0 mc, minimum
Over-all Bandpass Ripple	3 dB, maximum
Oscillator Radiation	15 μV, maximum
Tuning Stability with Signal Level (Signal level changes to -40 dBm)	0.001%, maximum
Tuning Dial Resetability	±1%
Local Oscillator Output	100 mV, minimum
AM Compression (Signal level to -20 dBm with AGC applied to tuner)	2 dB, maximum
IF Outputs (No. 1 and No. 2)	21.4-mc center frequency
Signal Monitor Output	21.4-mc center frequency
Analog Tuning Output	Band A: -1.0 volt at 30 mc to -11.0 volts at 60 mc Band B: -1.0 volt at 54 mc to -11.0 volts at 260 mc
Automatic Tuning Mode (Type SVT-30C only)	The tuning rate for sweeping a complete band is 30 seconds, maximum
Input Power	120 volts, ±10%, 60 cps
Power Consumption	VT-30C: 28 watts, approximately SVT-30C: 41 watts, approximately
Size	19 inches wide, 3.5 inches high and 17 inches deep
Weight	VT-30C: 15 lbs, approximately SVT-30C: 21.5 lbs

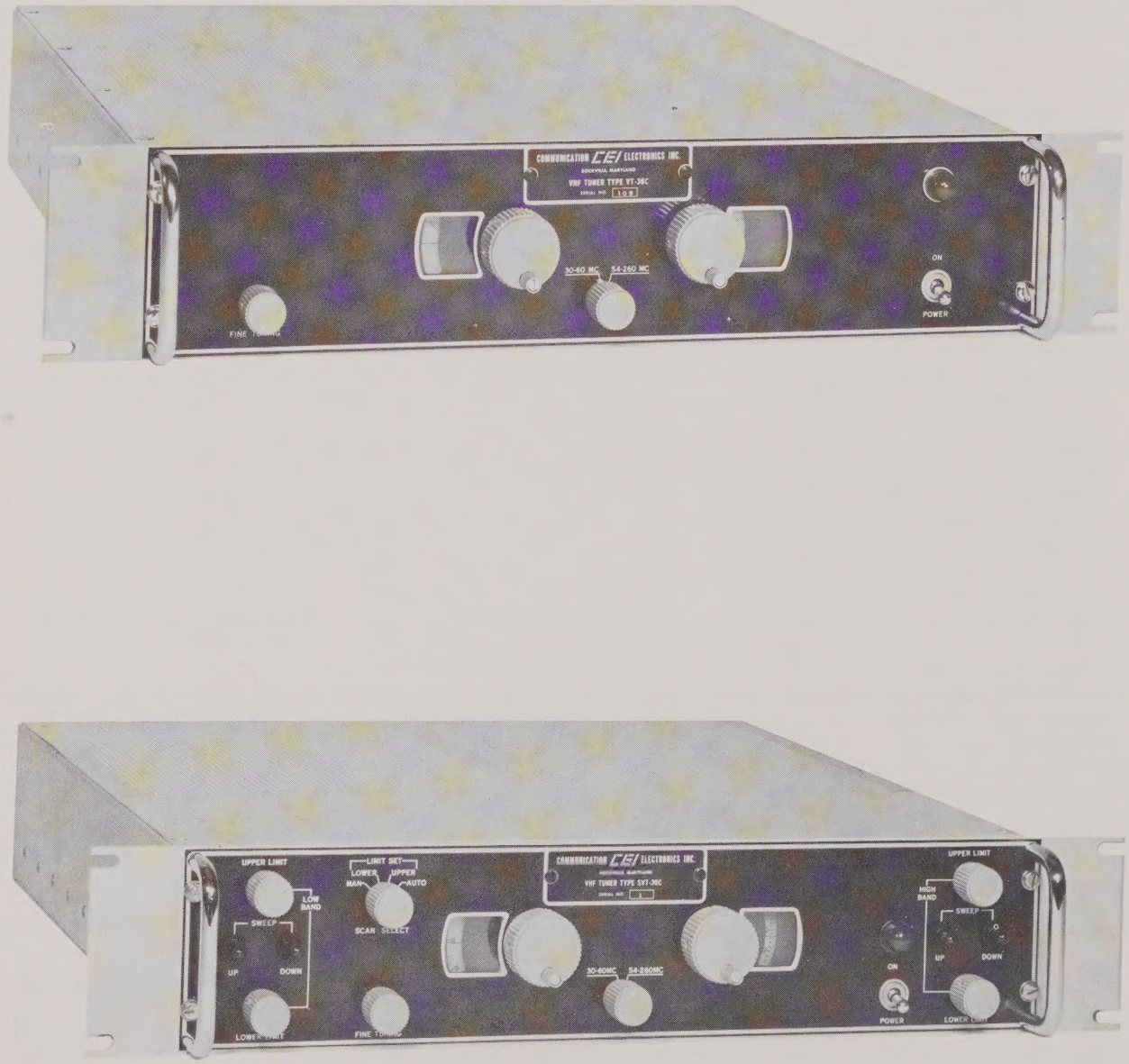


Figure 1-1. Types VT-30C (Top) and SVT-30C Tuners, Front Views

SECTION I

GENERAL DESCRIPTION

1.1 GENERAL

This instruction manual covers the type VT-30C and type SVT-30C tuners. These two units are nearly identical, differing only by the fact that the SVT-30C includes motors, with associated circuitry, which can be used to drive the tuners. This instruction manual has been prepared for the VT-30C, with appropriate additions included to explain those areas which are unique to the SVT-30C.

1.2 ELECTRICAL CHARACTERISTICS

The VT-30C tuner is designed to convert an RF signal in the 30-260 mc frequency range to 21.4 mc. The tuner covers the frequency range in two bands: 30-60 mc and 54-260 mc. Three inputs are required for normal operation; five outputs are available. Pertinent specifications for the tuner are included in Table 1-1; the tube and transistor complement is presented in Table 1-2.

1.3 MECHANICAL CHARACTERISTICS

As shown in Figure 1-1, the front panel of the VT-30C mounts the FINE TUNING control, the band switch, the tuning knobs for each band, the POWER switch with the ON position marked, and a red power indicator lamp. The SVT-30C additionally contains an auto-manual-limit set switch and LOWER LIMIT and UPPER LIMIT controls.

1.3.1 The chassis rear apron mounts the following inputs and outputs: the RF INPUTS J1 and J2 for the 30-60-mc and 54-260-mc frequency bands, respectively; the LO OUTPUT, J6; AGC INPUT, J4; IF OUTPUT 1, A6J2; IF OUTPUT 2, A6J9; SM OUTPUT, A6J4; and TUNER FUNCTIONS, J9. The RF INPUT and LO OUTPUT jacks are type-N connectors; the TUNER FUNCTIONS jack is a 19 pin connector; the remainder of the input and output jacks are type-BNC connectors. Also contained on the chassis rear apron are: a SLOW-BLOW 3/10 AMP fuse, F1; a SPARE fuse, and a permanently connected power cord.

1.3.2 The main chassis and front panel are constructed of aluminum as are the top and bottom dust covers. The front panel is overlaid with a black-anodized etched plate. The main chassis of the tuner contains six subassemblies. Three of these, the low-band tuner, the high-band tuner, and power splitter module are constructed on silver-plated, gold-flashed, brass chassis to prevent tarnishing. The remaining three subassemblies, the delayed AGC amplifier, power supply, and power supply regulator modules, are constructed on plug-in type, etched circuit boards. The SVT-30C additionally contains: three power supply regulators and two scan limit switches which are constructed on etched circuit boards. These are all plug-in type modules. The unit is designed for rack mounting in a standard 19-inch rack. Over-all dimensions are 19-inches wide, 3.5-inches high, and 17-inches deep.

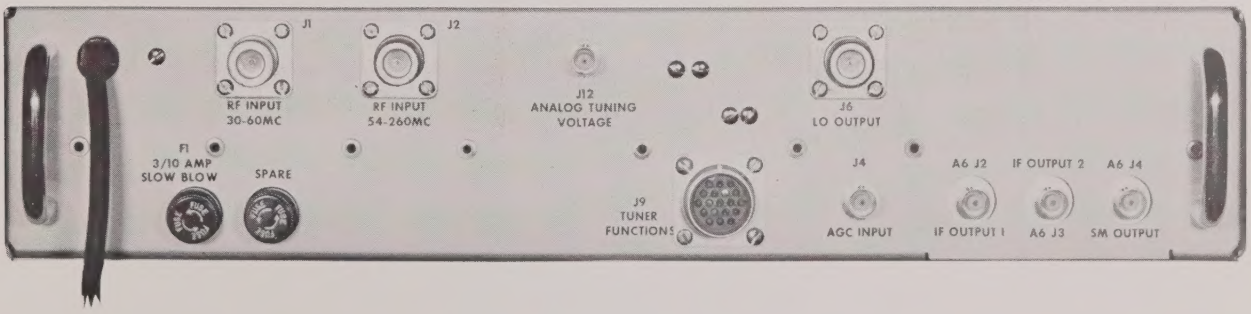


Figure 1-2. Type VT-30C Tuner, Rear View

Table 1-2. Tube and Transistor Complement

Symbol	Type	Function
Main Chassis		
Q1	2N1544	Voltage Regulator
Low Band Tuner		
A1V1	6CW4	RF Amplifier
A1V2	6CW4	RF Amplifier
A1V3	7587	Mixer
A1V4	6CW4	Oscillator
High Band Tuner		
A2V1	8058	RF Amplifier
A2V2	8058	RF Amplifier
A2V3	7587	Mixer
A2V4	6CW4	Oscillator
Scan Limit Switch (Type SVT-30C Only)		
A3/A6Q1	2N697	Amplifier
A3/A6Q2	2N3251	Amplifier
A3/A6Q3	2N3251	Amplifier
A3/A6Q4	2N697	Current Regulator
A3/A6Q5	2N3251	Amplifier/Relay Driver
A3/A6Q6	2N3251	Amplifier
A3/A6Q7	2N697	Amplifier
Power Supply Regulator		
A4Q1	2N1038	Voltage Regulator
A4Q2	2N3251	Amplifier
Power Splitter		
A6Q1	2N2708	Shaping Amplifier
A6Q2	2N706	Emitter Follower
A6Q3	2N706	Emitter Follower
A6Q4	2N706	Emitter Follower
Delayed AGC Amplifier		
A7Q1	2N3251	Emitter Follower
A7Q2	2N2270	Current Regulator
Power Supply Regulator (Type SVT-30C Only		
A8Q1	2N1038	Voltage Regulator
A8Q2	2N1038	Voltage Regulator
A8Q3	2N3251	Amplifier
Power Supply Regulator (Type SVT-30C Only)		
A9Q1	2N3053	Voltage Regulator
A9Q2	2N2270	Amplifier
A10	Same as A6 (Type SVT-30C Only)	

Figure 2-1

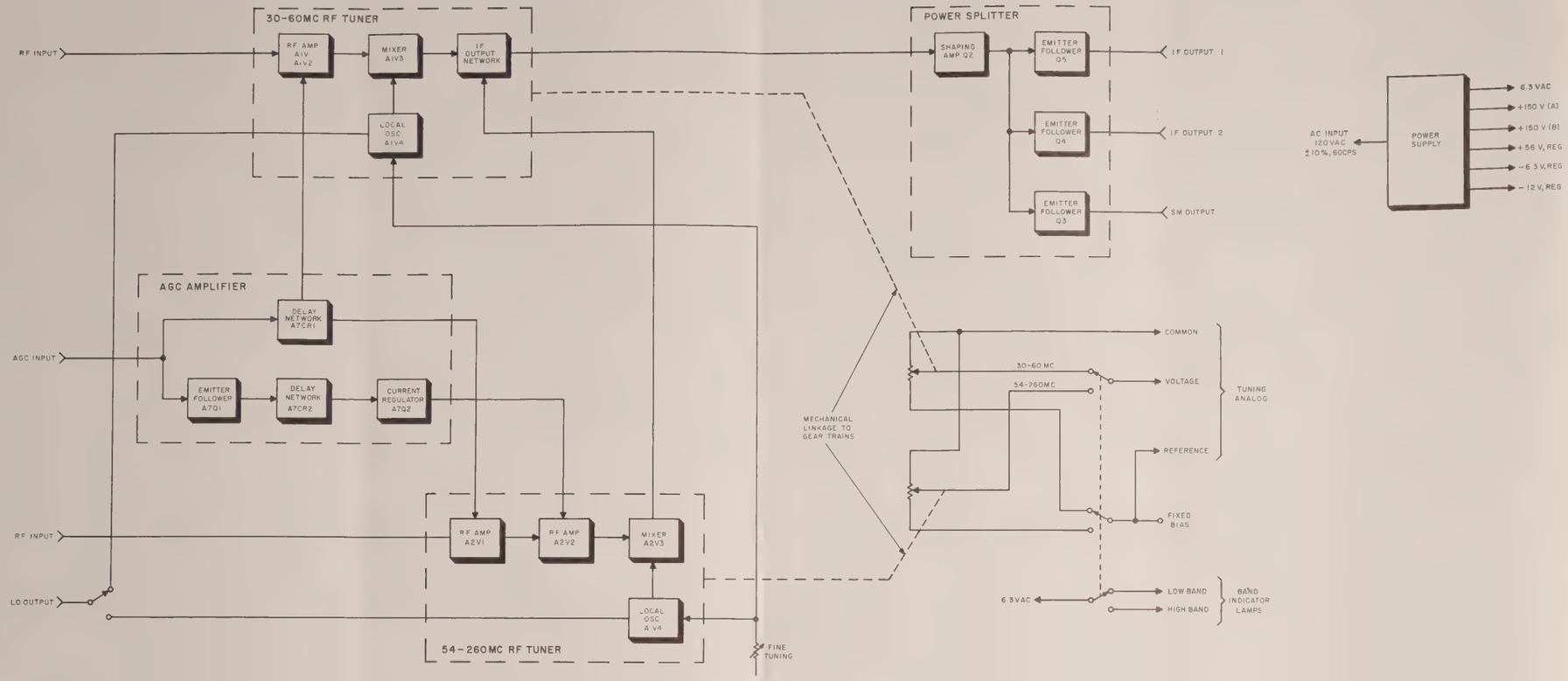


Figure 2-1. Type VT-30C Tuner. Functional Block Diagram

SECTION II

CIRCUIT DESCRIPTION

2.1 GENERAL

The operation of the various stages in the types VT-30C and SVT-30C tuners is explained using the functional block diagram, Figure 2-1, and the schematic diagrams included at the back of this manual. Note that the unit numbering system is used for the electrical components which means that parts on subassemblies and modules carry a prefix before the usual class letter and number of the item (such as A1R1 and A2C39). These subassembly prefixes are omitted on illustrations and in the text except in those cases where confusion might result from their omission.

2.2 FUNCTIONAL DESCRIPTION

The type VT-30C tuner is a superheterodyne type which covers the frequency range of 30-260 mc in two bands: 30-60 mc and 54-260 mc. The tuner amplifies and converts the incoming frequency to a 21.4-mc IF output.

2.2.1 An incoming signal to the low-band tuner is amplified by A1V1 and A1V2 and applied to the mixer stage, A1V3. The local oscillator, A1V4, operates 21.4 mc higher than the incoming signal. The local oscillator output is also applied to the mixer. The 21.4-mc difference frequency from the mixer passes through an IF output network which is common to the output from the high-band tuner. The 21.4-mc IF from the IF output network is connected to the power splitter module.

2.2.2 An incoming signal to the high-band tuner is amplified by A2V1 and A2V2 and applied to the mixer stage A2V3. The local oscillator, A2V4, operates 21.4 mc higher than the incoming signal. The local oscillator output is also applied to the mixer stage A2V3. The 21.4-mc difference frequency from the mixer is connected through the common IF output network in the low-band tuner to the power splitter module.

2.2.3 The LO OUTPUT (local oscillator output) is derived from a switching network which is connected to the oscillators in both tuners. The FINE TUNING control changes the local oscillator frequency of the tuner in operation to provide a vernier tuning method.

2.2.4 The power splitter module contains the shaping amplifier Q1 and three parallel emitter followers. The shaping amplifier response adds to the over-all tuner response to provide the desired bandwidth of approximately 3 mc. The emitter followers provide two IF OUTPUTS of 21.4 mc and an SM OUTPUT.

2.2.5 The AGC voltage for the unit must be supplied from an external source and be negative going with increasing signal strength. It is applied simultaneously to a delay network and to emitter follower A7Q1. The output of the delay network provides gain control of the RF amplifier in the low-band tuner and RF amplifier A2V1 in the high-band tuner. An additional delay is provided for RF amplifier A2V2 by the A7CR2 network which, in turn, is driven by A7Q1. Once the AGC voltage has reached the point that it controls the conduction of current regulator A7Q2 the gain of A2V2 is reduced by decreasing the current flow through the tube.

2.2.6 Contacts on the front-panel bandswitch have been arranged to provide external indications by means of band indicator lamps and tuning analog voltages.

2.2.7 The tuning voltage analog output is derived from the arms of potentiometers which are mechanically linked to the gear trains. These potentiometers are connected to a fixed bias voltage which also appears at the reference voltage analog output. The bandswitch selects the output of the potentiometer which corresponds to the tuner in operation.

2.2.8 The band indicator lamp voltage is provided at a jack on the rear apron by parallel wiring with the internal band dial lamps.

2.2.9 The self-contained power supply consists of plug-in modules and main chassis components which provide

all of the necessary operating voltages. The primary power required is 120 vac, ±10%, 60 cps.

2.2.10 Automatic tuning of the SVT-30C is performed by two motors with one linked to the gear train of each tuner. The automatic tuning feature allows continuous scannin between adjustable limits. Upper and lower scan limit controls are mounted on the front panel. The motor sweeps the tuner across the frequency band until a scan limit is reached at which point the motor will automatically reverse and sweep the tuner in the opposite direction until the other scan limit is reached. At this point the motor will again reverse and repeat the procedure. Manual tuning by means of the front panel knobs is performed when the auto-manual limit set switch is in the MAN position.

2.3 LOW-BAND TUNER

The type 7197 low-band tuner covers the 30-60 mc frequency range. It consists of a cascode RF amplifier, a local oscillator and a mixer. The tuner schematic diagram is shown in Figure 6-1; the reference designation prefix is A1.

2.3.1 RF Amplifier. - The low-band tuner RF amplifier consists of two type 6CW4 Nuvistor triodes, V1 and V2, in a cascode configuration to provide high gain with a low noise figure. The input is a tapped, single-tuned circuit designed to work with a 50-ohm antenna. Neutralization is achieved by feeding a small out-of-phase signal from the plate to the grid of V1 through the broadband transformer T1. Coupling from the RF amplifier to the mixer is by means of a double-tuned circuit. Tuning within the RF amplifier is by inductors L2A, L2B, and L2C, three sections of a four-section inductuner. The gain of the tuner is controlled by an AGC voltage fed to the grid of V1 through R2 and R3. The dynamic range of the unit is extended by use of a delayed AGC voltage and the series network of CR2 and R4 which prevents overloading at very high signal levels. The diode is reverse biased except on extremely strong signals so that it normally has no effect on the circuit.

2.3.2 Local Oscillator. - The low-band tuner local oscillator is a type 6CW4 Nuvistor triode, V4, operated in a Colpitts configuration with the plate at RF ground. The tank circuit is tuned by inductor L2D, a section of the inductuner. The frequency of operation is maintained 21.4 mc above the carrier. The output of the oscillator is coupled to the grid of the mixer through capacitor C18. The oscillator frequency can be varied by the FINE TUNING control which varies the dc voltage applied across the terminals of voltage-variable capacitor CR1. A voltage-variable capacitor is a semiconductor device whose effective capacitance varies as a function of the voltage applied across its terminals. Since CR1 is in parallel with the oscillator tank circuit, changing the voltage across CR1 changes the oscillator frequency.

2.3.3 Mixer. - The low-band tuner mixer, V3, is a type 7587 Nuvistor tetrode with its input circuit tuned by inductuner section L2C. Both the signal from the RF amplifier and the output of the local oscillator are applied to its grid, and the two signals are mixed to produce a 21.4-mc IF. Isolated test point TP1 can be used to check oscillator injection and also to check RF alignment by means of an oscilloscope. The mixer output is a plate circuit pi-network formed by capacitor C22 as one leg, the variable inductor L5 and the mixer plate capacitances plus cable capacitance as the other leg. This network also serves as the high-band tuner mixer output network. The 21.4-mc IF signal from the high-band mixer is connected into the low-band tuner through jack J2; the common output is taken through dc-blocking capacitor C24 and jack J3.

2.4 HIGH-BAND TUNER

The type 71108 high-band tuner covers the 54-260 mc frequency range. It consists of a cascode RF amplifier, a local oscillator and a mixer. A schematic diagram of the tuner is shown in Figure 6-2; the reference designation prefix is A2.

2.4.1 RF Amplifier. - The high band tuner employs two type-8058 Nuvistor triodes, V1 and V2, connected in a cascode configuration as the RF amplifier. The input to the tuner is from jack, J1, through capacitor C2 to the grid of V1. Resistor R2 terminates the input. Inductuner section L1A tunes the input stage. The amplifier is neutralized by the use of a bridge network which balances the plate-to-grid capacitor C9, the combination of C5 and C6, the input capacitance of V1, and the grid-to-plate capacitance of V1. The plate of V2 is tuned by section L1B of the inductuner. The gain of the tuner is controlled by external AGC circuits which control the bias applied to V1 and the cathode current of V2.

2.4.2 Local Oscillator. - The local oscillator stage, V4, employs a type-6CW4, Nuvistor triode in a Colpitts configuration. It is tuned by L1D, a section of the inductuner. Oscillator frequency is maintained 21.4 mc above

the incoming RF signal. Tank circuit capacitors C20 and C21 have a negative temperature coefficient to compensate for frequency drift due to ambient temperature change. The output of the oscillator is coupled into the grid circuit of the mixer through coupling capacitor C26. Series-connected capacitors C10 and C12 feed an out-of-phase portion of the oscillator output into the RF amplifier-mixer coupling network to reduce oscillator radiation. The pitch of the CW audio signal is varied by changing the voltage applied to voltage variable capacitor, CR1. This diode is effectively in parallel with the oscillator tank in the grid circuit of V4. Rotating the front-panel BFO TUNING control varies the voltage applied to CR1. The capacitance of CR1 is a function of the applied voltage, hence, the frequency of the oscillator is changed, and with it, the BFO beat tone.

2.4.3 Mixer. The mixer stage, V3, utilizes a type-7587 Nuvistor tetrode. The interstage coupling network between the RF amplifier second stage and the mixer is tuned by section L1C of the inductuner. The mixer stage heterodynes the incoming RF signal and the local oscillator signal to produce a 21.4-mc IF signal in the plate circuit. The plate circuit signal is coupled through dc-blocking capacitor C41 and jack J2 to the common IF output network located in the low-band tuner.

2.5 BANDSWITCHING

The bandswitches in the VT-30C and SVT-30C perform various internal and external functions; refer to the main chassis schematics, Figures 6-11 and 6-12 respectively.

2.5.1 In the VT-30C: Sections S1B-W and S1B-Y connect 150 vdc to the selected tuner. Section S1B-X connects 6.3 vac to the dial lamp for the selected band and also to pin 7 of J9 for the low-band tuner or pin 8 of J9 for the high-band tuner. Section S1A-X connects the tuning analog voltage to pin 2 of J9. The tuning analog voltage is obtained from the wiper of potentiometer R3 or R4. Section S1A-W switches the tuning reference voltage between R3 and R4. This tuning reference voltage appears at pin 3 of J9. Section S1A-Z operates relay K1 which transfers the local oscillator output of the selected tuner to the rear-panel LO OUTPUT jack, J6.

2.5.2 In the SVT-30C: Sections S1A-X and S1B-X connect 150 vdc to the selected tuner. Section S1B-W connects 6.3 vac to the dial lamp for the selected band and also to pin 7 of J9 for the low-band tuner or pin 8 of J9 for the high-band tuner. Section S1B-Y connects the tuning analog voltage to J12 and to pin 2 of J9. The tuning analog voltage is obtained from the wiper of potentiometer R3 or R4. Section S1A-Y switches the tuning reference voltage between R3 and R4. This tuning reference voltage appears at pin 3 of J9. Section S1A-W connects one side of the 120 vac line to the drive motor and sweep indicator lights associated with the selected band. Section S1A-Z performs the same function described for the VT-30C.

2.6 POWER SPLITTER

A schematic diagram of the type 7913 power splitter is shown in Figure 6-7; its reference designation prefix is A6. The 21.4-mc IF input to the shaping amplifier, Q1, is coupled through jack, J1 from the common IF output network located in the low-band tuner. The IF output network has an approximate bandwidth of 2.5 mc with a peaked response. The collector circuit of Q1 is double-tuned and over-coupled to produce an approximate bandwidth of 3.5 mc. The combination of the two response curves provides a resultant response bandwidth of 3 mc at the output of the shaping amplifier. Neutralization is accomplished by coupling a small out-of-phase signal from the junction of L1 and C11 to the base of Q1 through C12. The output from the shaping amplifier is tapped down by a capacitive voltage divider (C5 and C6) and is applied simultaneously to the bases of parallel emitter followers, Q2, Q3 and Q4 which comprise the power splitter. The power splitter provides three outputs of 21.4 mc: IF OUTPUT #1, IF OUTPUT #2 and SM OUTPUT. The SM OUTPUT is used to drive an associated signal monitor.

2.7 DELAYED AGC AMPLIFIER

The type 7929 delayed AGC amplifier module provides gain control for the low-band and high-band tuners. A schematic diagram is included as Figure 6-8; the reference designation prefix is A7. The input voltage to the delayed AGC amplifier module comes from an external source and is connected through the AGC INPUT jack, J4 with a parallel connection to pin 13 of J9; both jacks are located on the rear apron. The input voltage is simultaneously applied to the delay circuits for both the low band and the high band.

2.7.1 The AGC delay network for the low-band tuner and RF amplifier A2V1 in the high-band tuner consists of diode CR1 and resistors R1, R2, and R3. Initially the diode is forward biased from the 150-vdc supply through R2, providing approximately 0.6 vdc of AGC voltage to the operating tuner. This is the maximum gain condition.

As the input AGC voltage swings in the negative direction with increasing signal strength a point will be reached where the negative-going voltage through R1 will overcome the positive voltage through R2, causing CR1 to stop conducting. AGC action now starts with the voltage through R1 controlling the gain of the low-band tuner, if being used, or of A2V1 if the high-band tuner is in use.

2.7.2 The remainder of the circuitry on the module is to control the gain of A2V2 in the high-band tuner. The gain control of this stage is delayed longer than A2V1. This additional delay is provided by CR2. Initially CR2 is forward biased from the 150-vdc supply through R5, clamping the base of current regulator Q2 at 0.6 vdc so that it conducts to saturation. This is the maximum gain condition for A2V2. Note that Q2 is connected between the cathode of A2V2 and a -6.2 vdc source provided by Zener diode CR3. At this time CR4 is forward biased so that the tube current flows through R10 to the emitter of Q2. As the input AGC voltage swings more negative with increasing signal strength the current through emitter follower Q1, a PNP transistor, and R6 increases until CR2 is reverse biased. Gain control of A2V2 now begins as the conduction of Q2 decreases as Q1 conducts harder. With a sufficiently strong input signal the conduction through Q2 will decrease until the voltage drop across R10 is insufficient to keep CR4 forward biased. Once CR4 cuts off the current for Q2 must flow through R9. As a result, the tuner gain decreases at a much slower rate for a given amount of input signal, thus increasing its signal-handling ability.

2.8 ANALOG OUTPUT

The tuning voltage analog output is derived from potentiometers R3 and R4 which are connected to the gear trains of the low-band and high-band tuners, respectively. As the tuner in operation is tuned across its band, an output voltage which is proportional to the frequency setting is applied to jack J12 (ANALOG TUNING VOLTAGE) and also to pin 2 of J9. In order that power supply variations are not interpreted as a change in the frequency dial, the bias voltage applied to R3 and R4 is also connected to the analog tuning reference output, pin 3 of J9, for comparitive purposes.

2.9 SCAN LIMIT SWITCH (Type SVT-30C only)

The type 7963 scan limit switch schematic diagram is shown in Figure 6-3; the reference designation prefixes are A3 and A6. Two scan limit switches are used per unit, one for each band. The scan limit switch is an electronic device which compares two voltages: input one from the analog tuning potentiometer associated with the tuner in operation, and input two from the limits set control network. The scan limit switch operates a relay, one function of which is to connect the proper point (related to the direction of scan) from the limits set control network to input two. The switch circuit operation is as follows: Assume the voltage at input one is -1 volt and the voltage at input two is -2 volts. The voltage at the common emitter junction of Q1 and Q7 under these conditions would be approximately -1.6 volts and Q1 would be conducting all the current from the constant current source, Q4. Transistor Q7 would be cut off due to the back biasing of its base-emitter junction. The collector current of Q1 conducts through R7 and R9, biasing Q2 and Q3 on. Since there is no conduction through Q7 there will be no voltage drop across biasing resistors R12 and R13, and Q5 and Q6 are also cut off. Since Q5, the relay driver, is not conducting, the relay is deactivated. Assume now that the voltage at input one begins to increase in the negative direction as the upper or lower scan limit is reset. The emitter voltage will also increase in a negative direction maintaining the approximate 0.6 volt base-to-emitter voltage drop of a conducting silicon transistor. As the voltage at input one becomes more negative than the voltage at input two, Q7 will become forward biased and begin to conduct. The Q7 base-to-emitter voltage drop will now hold the common emitter junction at approximately -2.6 volts. As the voltage at input one continues to become more negative, Q1 will cut off, cutting off Q2 and Q3. Conduction of Q7 will turn on Q5 and Q6. The current through Q5 will then activate the relay. The network of resistor R1 and potentiometers R2 and R3 provide calibration adjustments to prevent the tuner from being driven past the ends of its frequency limits. Diode CR4 damps out transients developed across the coil of the relay as it is cut on and off.

2.10 AUTOMATIC-MANUAL TUNING MODE

The type SVT-30C tuner includes provisions for either motor-drive or manual operation of the gear train associated with each band. Refer to Figure 6-12 as required.

2.10.1 Assume the auto-manual-limit set control switch is in the AUTO mode, the bandswitch in the low-band position, and the scan limits set at 30 and 60 mc. The motor B1 will drive the low-band tuner to 30 mc at which point the Scan Limit Switch module, A3, will activate relayK2. Relay K2 will activate relay K3 which will reverse

the direction of motor B1 by placing a phase-shift network (C19 and R42) in series with the opposite motor winding. The low-band tuner will now be driven to 60 mc at which point the Scan Limit Switch will de-activate relay K2. De-activation of relay K2 will de-activate relay K3 which again reverses the direction of motor B1. Relay K3 also switches the 120 vac to lights DS4 and DS5 which indicate the direction of scan.

2.10.2 Motor B2, relays K4 and K5, Scan Limit Switch module A6, and lights DS6 and DS7 operate in conjunction with the high-band tuner in exactly the same manner as previously described for the low-band tuner. Positioning the auto-manual-limit set switch in the MAN mode necessitates that the unit be tuned using the knobs on the front panel.

2.11 AUTO-MAN-LIMIT SET SWITCH (Type SVT-30C only)

The auto-man-limit set switch (S3) is mounted on the front panel and performs the following functions. Sections S3A-W and S3D-X connect one side of the 120 vac line to motors B1 and B2, respectively. Section S3B-W connects one side of the 120-vac line to the sweep direction lamps. Sections S3C-X and S3D-W connect the phase-shifting networks into the circuit when S3 is in the AUTO position; an open circuit is provided in any other switch position to prevent the motors from causing a drag when manually tuning. Sections S3A-X and S3B-X connect the low-band limits set network and high-band limits set network to the associated scan limit switches.

2.12 POWER SUPPLY

The power supply operates from a primary power source of 120 vac, ±10%, 60 cps.

2.12.1 The VT-30C power supply consists of components mounted on the main chassis and two plug-in etched circuit boards: the type 7611 power supply rectifier and the type 7655A power supply regulator. Schematic diagrams are shown in Figures 6-5 and 6-4; the reference designation prefixes are A5 and A4 respectively.

2.12.2 The ac input to the unit is connected through the line fuse F1 and the POWER switch S2 to the primary winding of the power transformer T1. The power transformer contains three secondary windings; one winding (8-9) is used to operate the lamps and some of the tube filaments, while the remaining two windings provide the ac input voltages to the power supply rectifier module.

2.12.3 The type 7611 power supply module rectifies ac voltages to provide all necessary unregulated dc voltages. Diodes A5CR1 through A5CR4 form a bridge rectifier which operates from the 10-12 winding of transformer T1 to provide input power for the -12 volt regulator. Diodes A5CR1 and A5CR3 of the bridge rectifier form a full-wave rectifier which provides input power to the -6.3 volt regulator. Diodes A5CR5 and A5CR6 form a full-wave rectifier which operates from the 5-6-7 winding of transformer T1. This output is filtered by C4A, L1 and C4B. From the output of the filter, Zener diodes CR1 and CR2 in conjunction with resistors R6 and R5, respectively, develop the +150 volt (A) and +150 volt (B) regulated sources. A5R2 is a dropping resistor which works in conjunction with Zener diode CR3 to provide the +56 volt regulated source. A5R1 works in conjunction with Zener diode A5CR7 to provide the proper fixed base voltage level for main chassis series regulator Q1 which provides the -6.3 volt regulated source.

2.12.4 The type 7655A power supply regulator is supplied from the -24 volt output of the power supply module R1 is a dropping resistor. R6 biases Zener diode CR1 in the emitter circuit of amplifier stage Q2. Variations in output voltage are fed through a sampling network consisting of resistors R7, R9 and potentiometer R8 to the base of Q2, causing variations in the collector current of this stage. The collector current of Q2 passes through resistors R2 and R3 setting the biasing level of the series voltage regulator, Q1. A rise in the output voltage causes an increase in collector current of Q2 which results in a larger voltage drop across R2 and R3, and a descrease in the bias level on Q1. Likewise, a decrease in output voltage will cause a decrease in the collector current of Q2 which will result in a smaller voltage drop across R2 and R3, and an increase in the bias level on Q1. A constant output voltage is therefore maintained. Input voltage variations are coupled through R4 to the base of Q2. As previously described, these voltage variations at the base of Q2 will cause bias level changes at the base of Q1. A rise in input voltage will result in a decrease in the bias level and a decrease in input voltage will result in an increase in the bial level, therefore effectively canceling out any voltage variations at the input. Potentiometer R8 permits a limited adjustment of output voltage.

2.12.5 The SVT-30C power supply consists of components mounted on the main chassis and four plug-in etched circuit modules: the type 7659A power supply rectifier, reference designation prefix A5, and the types 7655A,

7656A, and 7657 power supply regulators. The latter three modules carry the reference designation prefixes A4, A9, and A8, respectively. Schematic diagrams for the modules are Figure 6-6, 6-4, 6-10 and 6-9, respectively.

2.12.6 The ac input to the unit is connected through the line fuse F1 and the POWER switch S2 to the primary winding of the power transformer T1. The power transformer contains four secondary windings. One winding (8-9) is used to operate the pilot and dial lights and some of the tube filaments. The remaining three windings provide the ac inputs to the power supply module.

2.12.7 The type 7659A power supply module rectifies ac voltages to provide all necessary unregulated dc voltages. Diodes A5CR2 and A5CR3 form a full-wave rectifier which operates from the 11-12-13 winding of transformer T1 to provide input power for the -6.3 volt regulator. Diodes A5CR4 and A5CR5 form a full-wave rectifier which operates from winding 5-6-7 of T1. This output is filtered by C4A, L1 and C4B. From the output of the filter, Zener diodes CR1 and CR2 in conjunction with resistors R6 and R5, respectively, develope the +150 volt (A) and +150 volt (B) regulated sources. Diodes A5CR6 through A5CR9 form two full-wave rectifiers which operates from the 8-9-10 winding of T1 to provide input power for the +24 and -24 volt regulators. Zener diode A5CR1 and A5R1 work in conjunction to provide the proper base voltage level for the main chassis series regulator stage Q1 which provides the -6.3 volt regulated source. A5R2 is a dropping resistor which works in conjunction with Zener diode CR3 to provide the +56 volt regulated source.

2.12.8 The type 7655A power supply regulator is supplied -24 volts regulated input power from the type 7657 power supply regulator. The types 7656A and 7657 power supply regulators are supplied from the +35 volt and -35 volt outputs of the power supply rectifier module. Except for voltage and current variations, the types 7655A, 7656A, and 7657 power supply regulator modules operate essentially the same. A description of the circuit operation for the type 7655A power supply regulator module was previously explained in paragraph 2.12.4.

SECTION III

INSTALLATION AND OPERATION

3.1 INSTALLATION

The tuner is designed for installation in a standard 19-inch rack. It requires 3.5-inches of vertical space and will project 15.3-inches back into the rack. Adequate ventilation should be provided.

3.1.1 Power Connections. - Plug the power cord into a 120 vac, ±10%, 60 cps source. The third pin of the power cord grounds the tuner. If a three-pin receptacle is not available, use the adapter provided.

3.1.2 Antenna Connections. - Connect the low-band antenna (30-60 mc) to the 30-60 MC RF INPUT, J1. Connect the high-band antenna (54-260 mc) to the 54-260 MC RF INPUT, J2.

3.1.3 Signal Monitor Connection. - Connect the signal monitor (if one is used) to the SM OUTPUT, A6J4, using a 50-ohm coaxial cable.

3.1.4 Local Oscillator Output. - The local oscillator signal from the tuner in operation appears at the LO OUTPUT, J6.

3.1.5 Tuning Analog Output. - The tuning analog output appears at pin 1 (shield), pin 2 (voltage), pin 3 (reference) and pin 4 (common) of J9. The tuning analog output voltage also appears at the ANALOG TUNING VOLTAGE, J12.

3.1.6 IF Output Signals. - A 21.4-mc IF output signal is available at the IF OUTPUT #1, A6J2, and at the IF OUTPUT #2, A6J3, regardless of which tuner (high band or low band) is used.

3.1.7 AGC Input. - An AGC voltage is required for normal operation of the unit. This voltage must be obtained from associated equipment in the system and connected to the AGC INPUT, J4, or pin 12 (shield) and pin 13 (input voltage) of J9.

3.1.8 Band Indicator Lamp Output Voltage. - The 6.3 vac used to operate the dial lamps is available at pin 7 (low band), pin 8 (high band) and pin 9 (common) of J9.

3.2 OPERATION

The operating controls on the front panel of the tuner are described in the following paragraphs. The controls are shown in Figure 1-1.

3.2.1 Tuning Controls. - Set the band switch to the 30-60 MC or the 54-260 MC position depending on the frequency to be received. A lamp will light behind the tuning dial corresponding to the band selected. The tuning dials may each be preset, allowing rapid switching between two RF carriers in different bands.

3.2.2 Fine Tuning Control. - Set the FINE TUNING control at mid-range when tuning with one of the main tuning knobs. Small corrections in receiver tuning can be effected by rotating the FINE TUNING control in either a clockwise or counterclockwise direction as necessary.

3.2.3 Power-On. - The POWER switch connects the source voltage to the power supply which ultimately provides the necessary power to the tuner. The red pilot lamp located above the switch will light when the power is on.

3.2.4 Auto-Manual-Limit Set Switch (Type SVT-30C Only). - The auto-manual-limit set switch is used to set the tuning mode of the unit for either continuous motor drive or hand operation using the front panel knobs. For automatic scanning, set band switch to desired band and set auto-man-limit set switch to LIMIT SET (upper). Manually tune to the highest frequency to be scanned and adjust UPPER LIMIT control to point at which the SWEEP DOWN lamp lights. Set switch to LIMIT SET (lower). Manually tune to the lowest frequency to be scanned and adjust LOWER LIMIT control to point at which SWEEP UP lamp lights. Set switch to AUTO to start continuous motor drive operation. To halt motor drive operation, set switch to MAN in which position tuner must be tuned by hand.

SECTION IV

MAINTENANCE

4.1 GENERAL

The Types VT-30C and SVT-30C Tuners have been carefully designed to operate for long periods of time with little more than routine maintenance. Should trouble occur, it is important that maintenance personnel be familiar with Section II, in which the circuits are described. In addition, they should refer to Figures 5-1 through 5-16 where the component locations are shown; to the schematic diagrams, Figures 6-1 through 6-12; to Table 4-1 which gives the tube, transistor, and module pin socket voltages; and to Table 4-2, the troubleshooting chart.

CAUTION

All maintenance work within this tuner should be kept to a minimum and performed only by trained and experienced personnel. The placement of components and the dress of leads in the equipment (especially within the RF tuners) have been carefully engineered to give optimum performance. In replacing any components, great care should be exercised to duplicate the exact physical layout of the original assembly.

4.2 MAINTENANCE OF GEAR TRAINS AND TUNING DIALS

The gear train mechanisms are friction drive and rely on the stops of the inductuners to halt the turning. The tuning dials are rigidly attached to their shafts and are geared to the tuners in a manner that makes it quite unlikely they will ever get out of position. However, if it becomes necessary to mechanically realign either dial (such as after an inductuner replacement), follow these steps:

(1) Release the Allen head setscrews on each side of the coupling between the gear train shaft and the inductuner shaft.
(2) Rotate the inductuner shaft to maximum clockwise position.
(3) Turn the dial until the hariline is at the second mark above 62, in the case of the low-band dial, or at the first mark above 260, in the case of the high-band dial.
(4) Tighten the coupling between the gear train and the inductuner shaft.
(5) Check the operation by turning the tuning crank counterclockwise until the inductuner no longer turns. The dial should read at the mark just beyond 30 in the case of the low-band tuner, and just beyond 54 in the case of the high-band tuner.

4.3 PLUG-IN MODULES

The modules used for the delayed AGC amplifier, power supply regulators, power supply rectifiers, and scan limit switches can be easily removed by pulling them out of the receptacles into which they are fitted. The numbers on the pins coming out of the modules correspond to the numbers indicated on the main chassis schematic diagrams, Figures 6-11 and 6-12, at the points where the connecting leads pass through the lines outlining each module on the schematic. For example, the output from the AGC amplifier to the high-band tuner is through pins 8 and 10 of the receptacle into which the AGC amplifier module is plugged.

4.4 TROUBLESHOOTING

Most troubles will be caused by failures of the fuse, tubes or semiconductors. The proper functioning of all these parts should be assured by test or by replacement with parts known to be good before any further troubleshooting is carried out. After the above measure has been carried out, initial troubleshooting should be directed toward localizing the problem to a specific portion of the unit. In the case of the plug-in modules, a quick check can be made by simply plugging in a new module known to be good. Another procedure which should be considered for localizing troubles is to feed in a signal at the antenna jack and then check the signals present at each test point.

To this end, it is desirable that all maintenance personnel familiarize themselves with the alignment procedures, even if an alignment is not required, as these procedures include methods of checking performance which may help in analyzing the cause of the trouble. In addition, be certain that the power supply is functioning normally before any other circuit is suspected. The troubleshooting procedures given in Table 4-2 have been included as a guide for maintenance personnel.

4.5 ALIGNMENT INSTRUCTIONS

The alignment procedures in this book are suitable for performance in the field when making periodic performance checks, or when making adjustments after replacing tubes or components. Only those controls specifically referred to within a series of steps given for aligning a particular circuit affect the work in that circuit. Those controls not mentioned in any one series of steps may be left in any position. The alignment of this unit should be performed only with suitable equipments by technicians thoroughly familiar with their use. If the limits and tolerances specified in the following steps cannot be obtained during a field alignment, a factory alignment is necessary. Allow several minutes for warm-up before beginning the work.

4.5.1 Use of Marker During Alignment. - A post-detection type marker adder is recommended, and the alignment procedures in this book assume that one is used. However, if such a marker adder is not available, the marker generator output should be loosely coupled to the sweep generator output. This can be done by connecting the marker signal source to a turn or two of insulated wire wrapped around the sweep generator lead near the point of connection to the circuit under test, or by coupling to the sweep generator lead through a small capacitor. To insure that the addition of the marker is not affecting the response curve, disconnect the marker generator and observe that no change in the curve's shape or symmetry occurs.

4.5.2 Use of Oscilloscope During Alignment. - The vertical and horizontal amplifier inputs on the oscilloscope should be set in the dc coupled mode. The dc component of the signal on the vertical input should be cancelled out by applying an equal voltage to the unused vertical differential scope input, since the dc component sometimes makes it impossible to center the signal vertically. Otherwise it will sometimes be necessary to use the ac coupled mode. A low-capacity shielded cable should be used to connect to the oscilloscope, and the shield should be grounded as closely as possible to the point to which the center conductor is connected.

4.5.3 Equipments Required. - The following equipments, or their equivalents, are required to perform the complete tuner alignment.

(1) Oscilloscope, Tektronix Type 503
(2) VTVM, RCA Type WV-98B
(3) Signal Generator, Hewlett Packard 608D
(4) Sweep Generator, Jerrold 900B with D-50 Detector
(5) Step Attenuator, Jerrold AV-50
(6) Demodulator, CEI type DM-4C with IFD-2000C or a Receiver, CEI type 960A
(7) Assorted cables, connectors, attenuation pads and alignment tools.

4.6 30-60 MC TUNER ALIGNMENT

The 30-60 mc tuner is aligned in part using an auxiliary demodulator which has a 21.4-mc input center frequency and a tuning meter. Make certain that this demodulator unit is correctly aligned and operating properly before an alignment of the 30-60 mc tuner is attempted.

4.6.1 Initial Settings. - Make the following initial settings:

(1) Terminate the AGC input to the VT-30C with a 50-ohm load at jack J4.
(2) Set the FINE TUNING control at mid-range.
(3) Set the bandswitch in the 30-60 MC position.

4.6.2 RF Circuit Alignment. - Proceed as follows:

(1) Set up the equipment as shown in Figure 4-1 using the HP 608D generator as the marker source.
(2) Set the VT-30C tuning dial to 30 mc and the sweep and signal generators to the same frequency.
(3) Remove the local oscillator tube, A1V4.
(4) Set the oscilloscope vertical sensitivity to 50 mv/cm.

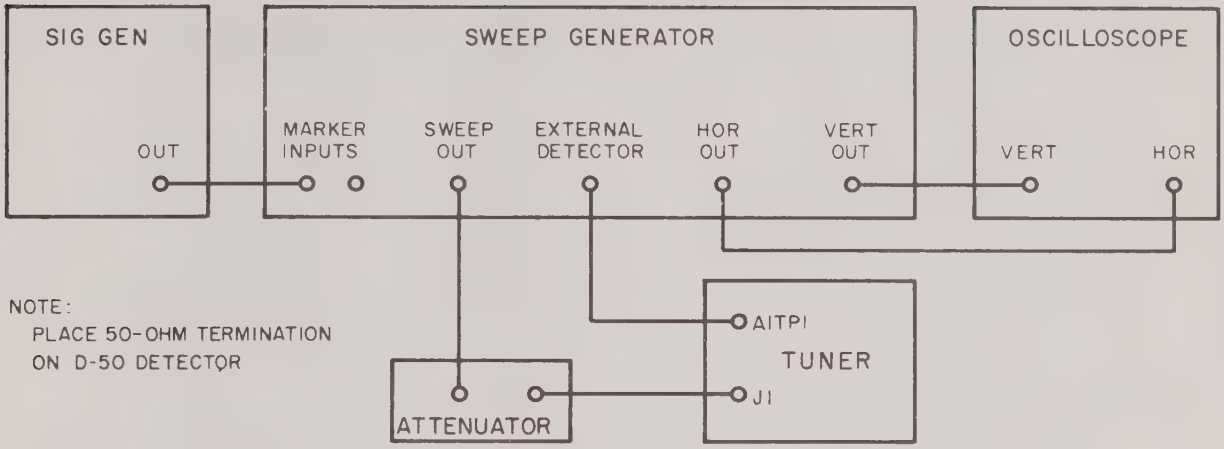


Figure 4-1. Equipment Setup, Tuner Alignment

(5) Adjust sweep generator sweep width and oscilloscope horizontal sensitivity until a response curve is displayed on the oscilloscope screen.

(6) Using the calibrated 30-mc marker from the signal generator, adjust A1C3 for maximum amplitude of the response at 30 mc.

(7) Adjust A1C13 and A1C15 for a maximum amplitude and symmetrical response centered at 30 mc.

(8) Check the response at 40 mc, 50 mc, and 60 mc using a corresponding marker at each frequency. The response shape will vary but the markers should still be on or between the peaks of the response curve. Typical RF responses at 30 mc and 60 mc are shown in Figure 4-2 and 4-3.

(9) Replace the local oscillator tube, A1V4.

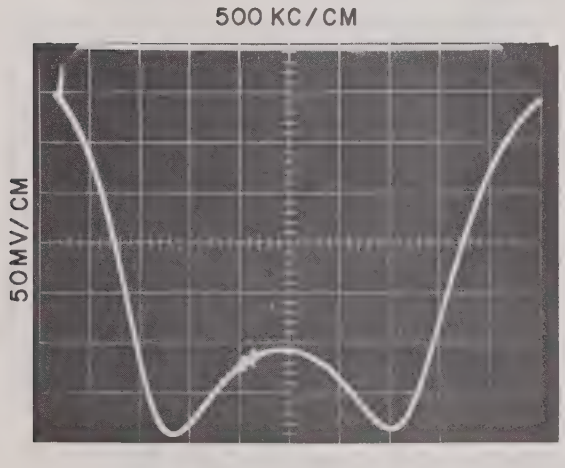


Figure 4-2. Typical Response Curve, RF Response at 30 mc

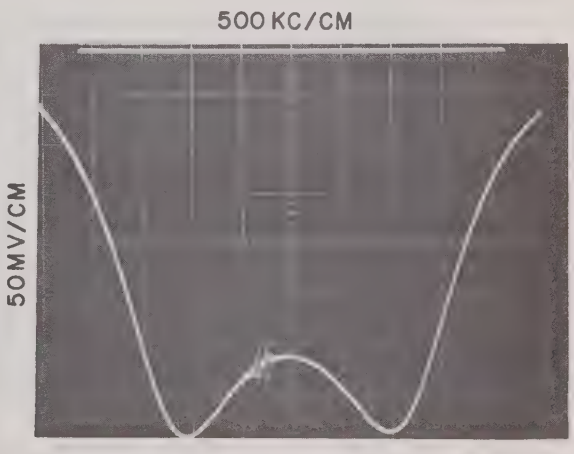


Figure 4-3. Typical Response Curve, RF Response at 60 mc

4.6.3 Local Oscillator Alignment. - Proceed as follows:

(1) Connect the output of the signal generator to the 30-60 MC RF INPUT, J1.

(2) Connect the IF OUTPUT #1, A6J2, to jack J1 on the DM-4C. Connect the AGC INPUT, J4, to jack J10 on the DM-4C. If the type 960A Receiver is to be used in lieu of the DM-4C for this test, place a 50-ohm termination on the AGC INPUT J4 and connect A6J2 to the input of the 20/200-kc bandwidth IF strip in the receiver (jack A3J1).
(3) Calibrate the signal generator to produce a 30-mc signal.
(4) Tune the VT-30C to the signal generator frequency, using the tuning meter on the DM-4C (or 960A Receiver) to indicate proper tuning.
(5) Adjust the signal generator output level for a one-half scale deflection on the signal strength meter on the DM-4C (or 960A Receiver).
(6) The VT-30C tuning dial should indicate 30.0 mc ± 1%.
(7) Repeat steps (3) through (6) for 40 mc, 50 mc, and 60 mc.
(8) If any of the tuning dial indications exceed the ± 1% tolerance, adjust A1C27. After any adjustment of A1C27, repeat steps (3) through (6).

4.6.4 Mixer Plate Coil Alignment and Shaping Amplifier. - Proceed as follows:

(1) Remove large cover from the low-band tuner.
(2) Connect equipment as shown in Figure 4-1 except that the D-50 input is connected to A6J2*; the sweep output is connected to A1V3, pin 4.
(3) Set the VT-30C tuning dial to 60.0 mc.
(4) Calibrate the signal generator for a 21.4-mc CW output signal.
(5) Adjust scope vertical sensitivity to 2 mv/cm.
(6) Set sweep generator to 21.4 mc and adjust output until a response appears on the scope.
(7) Adjust A1L5, and A6L1* and A6L2* on the power splitter chassis for maximum amplitude of a symmetrical overcoupled response centered at 21.4 mc.
(8) The over-all low-band tuner response may now be checked. Connect the sweep output to jack J1 and the D-50 input remains at A6J2*. Typical responses at 30 mc and 60 mc are shown in Figures 4-4 and 4-5.
(9) Replace bottom cover.

* A6 becomes A10 on SVT-30C tuner.

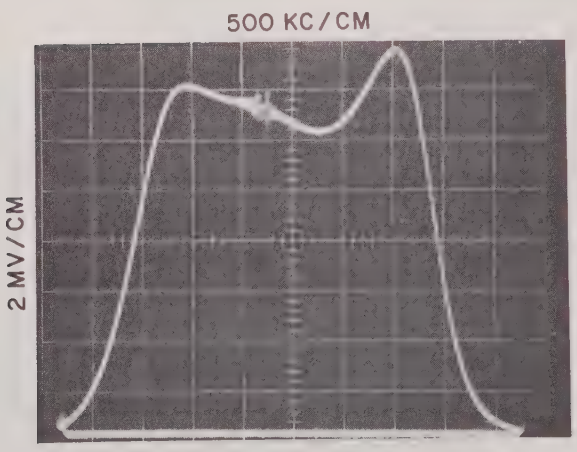


Figure 4-4. Typical Response Curve, Over-all Response at 30 mc

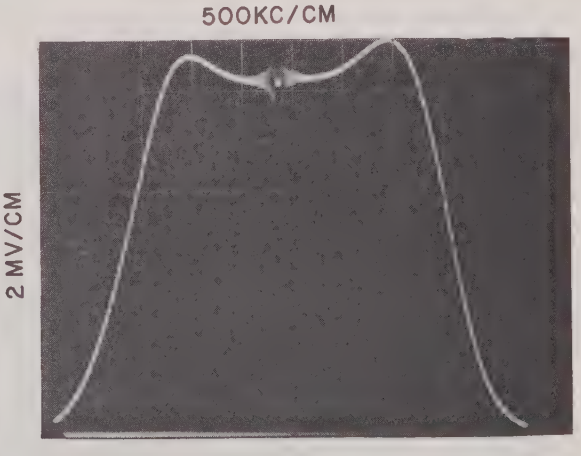


Figure 4-5. Typical Response Curve, Over-all Response at 60 mc

4.7 54 TO 260 MC TUNER ALIGNMENT

The 54-260 mc tuner is aligned in part using an auxiliary demodulator which has a 21.4-mc center frequency and a tuning meter. Make certain that this demodulator unit is correctly aligned and operating properly before an alignment of the 54-260 mc tuner is attempted.

4.7.1 Initial Settings. - Make the following initial settings:

(1) Set the FINE TUNING control to mid-range.
(2) Set the bandswitch in the 54-260 MC position.

4.7.2 Local Oscillator Alignment. - Proceed as follows:

(1) Connect the output of the signal generator to the 54-260 MC RF INPUT, J2.
(2) Connect IF OUTPUT #1, A6J2, to jack J1 on the DM-4C. Connect the AGC INPUT, J4, to jack J10 on the DM-4C. If the type 960A Receiver is to be used in lieu of the DM-4C for this test, place a 50-ohm termination on the AGC INPUT J3 and connect A6J2 to the input of the 21/200-kc bandwidth IF strip in the receiver (jack A3J1).
(3) Calibrate the signal generator to produce a 240-mc CW signal.
(4) Tune the VT-30C to the generator frequency using the tuning meter on the DM-4C (or 960A Receiver) to indicate proper tuning.
(5) Adjust the signal generator output level until the signal strength meter on the DM-4C or 960A reads approximately one-half scale.
(6) The VT-30C dial should indicate 240 mc ± 1%.
(7) Repeat steps (3) through (6) for frequencies of 54 mc and 150 mc.
(8) If any of the tuning dial indications exceed the ± 1% tolerance, adjust A2C29 and repeat steps and repeat steps (3) through (6) until the tolerance is met at all three frequencies.

4.7.3 RF Amplifier to Mixer Interstage Alignment. - Proceed as follows:

(1) Terminate the AGC input to the unit with a 50-ohm load at jack J4.
(2) Remove small bottom cover from the tuner chassis.
(3) Unsolder A2C4 from the junction of A2L3 and A2L4, carefully noting the capacitor's position so that it may later be resoldered to exactly the same point in the same position.
(4) Set up the equipment as shown in Figure 4-1 except that the external detector input will be connected to A2TP1 and the sweep output will be connected to the loose end of A2C4.
(5) Remove A2V4.
(6) Set the oscilloscope vertical sensitivity to 50 mv/cm.
(7) Set the oscilloscope horizontal sensitivity to produce a base line approximately 10 centimeters wide.
(8) Set the VT-30C tuning dial to 240 mc and sweep generator to a 240 mc center frequency.
(9) Using a calibrated 240-mc signal from the signal generator as a marker, adjust A2C11 and A2C18 for maximum amplitude of a symmetrical, over-coupled response with the 240-mc marker appearing in the center.
(10) Use the ALC control on the sweep generator to set the vertical scope display at 8 centimeters, and tune A2C15 to produce a one and one-half centimeter dip at the center of the response.
(11) This may require that steps (9) and (10) be repeated in order several times to obtain the correct response results. A typical RF interstage response curve at 240 mc is shown in Figure 4-6.

4.7.4 Input Circuit Alignment. - Proceed as follows:

(1) If A2C4 has been unsoldered from the junction of A2L3 and A2L4, resolder it to the exact position from which it was taken.
(2) Set up equipment as shown in Figure 4-1, except that the output of the sweep generator is now connected to the 54-260 MC RF INPUT, J2, and the external detector input to A2TP1.
(3) Set the oscilloscope vertical sensitivity to 50 mv/cm.
(4) Set the oscilloscope horizontal sensitivity to produce a base line approximately 10 centimeters wide.
(5) Set the VT-30C tuning dial to 85 mc and the sweep generator to approximately 85 mc. Calibrate the signal generator for a 85-mc CW signal.
(6) Adjust A2C5 for maximum gain and symmetrical response.
(7) The 85-mc marker should appear within the response curve peaks. A typical response is shown in Figure 4-7.
(8) Repeat step (5) for frequencies of 54 mc, 150 mc, and 260 mc. Typical RF responses at these frequencies are shown in Figures 4-8, 4-9 and 4-10.
(9) If the markers at the different frequencies do not fall within the response curve peaks, it will be necessary to repeat both the interstage alignment and the RF input circuit alignment.

(10) Over-all high-band tuner responses at 54 mc, 150 mc and 260 mc are presented in Figures 4-11, 4-12 and 4-13 respectively. These responses were obtained using the test setup shown in Figure 4-1 with the sweep output connected to the 54-260 MC RF INPUT, J2, and the D-50 input connected to A6J2 on the VT-30C.

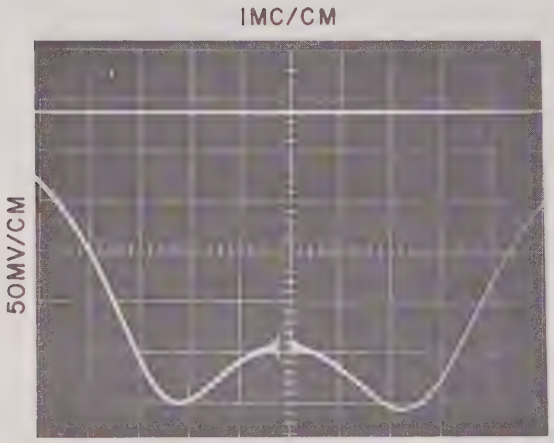


Figure 4-6. Typical Response Curve, RF Interstage Response at 240 mc

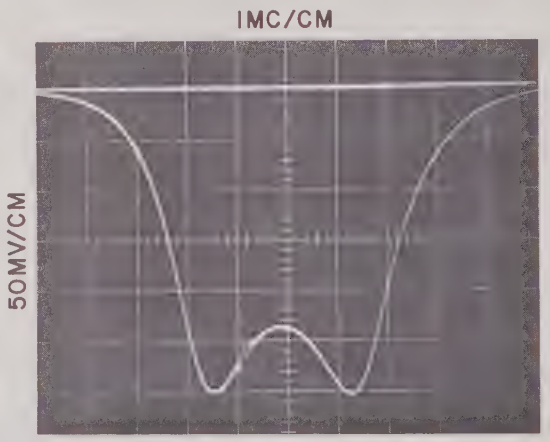


Figure 4-7. Typical Response Curve, RF Response at 85 mc

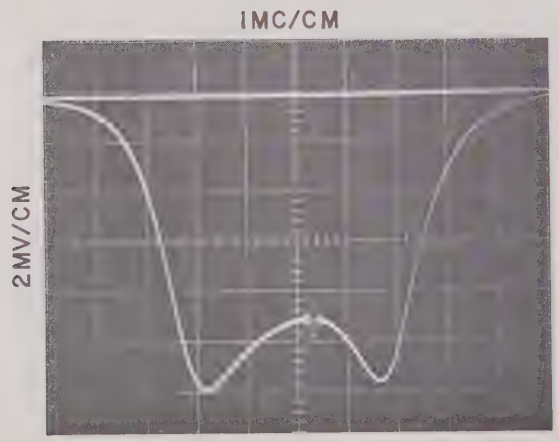


Figure 4-8. Typical Response Curve, RF Response at 54 mc

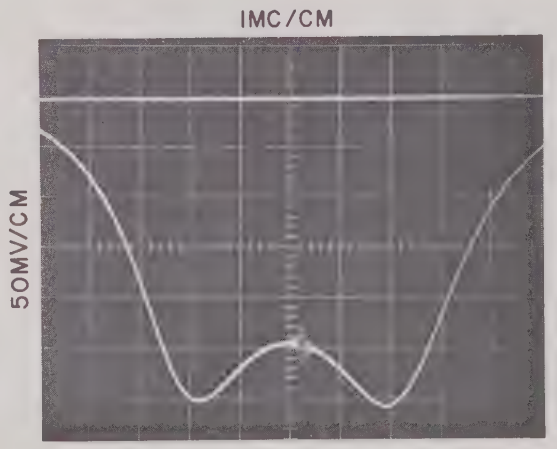


Figure 4-9. Typical Response Curve, RF Response at 150 mc

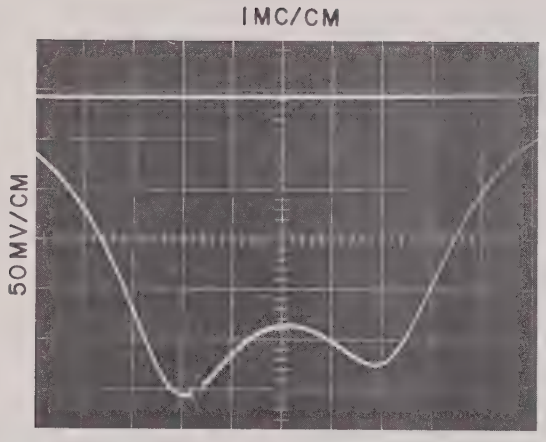


Figure 4-10. Typical Response Curve, RF Response at 260 mc

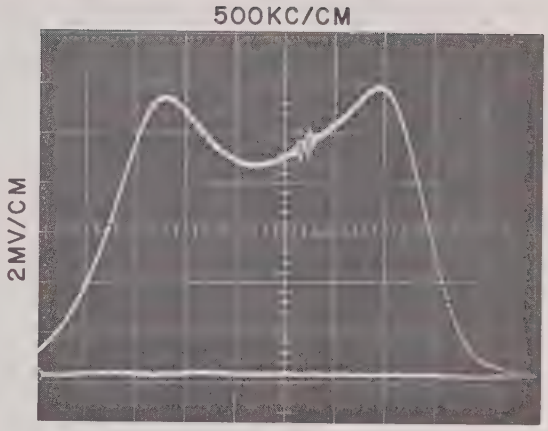


Figure 4-11. Typical Response Curve, Over-all Response at 54 mc

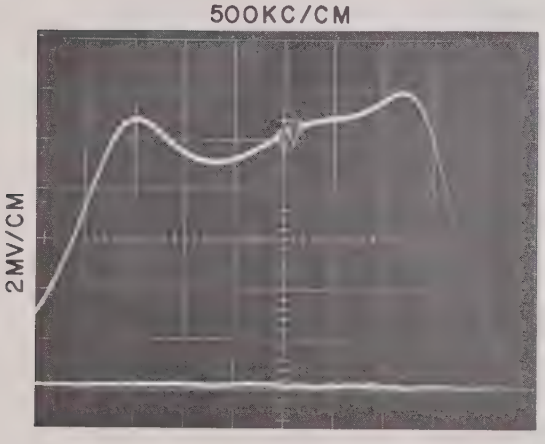


Figure 4-12. Typical Response curve, Over-all Response at 150 mc

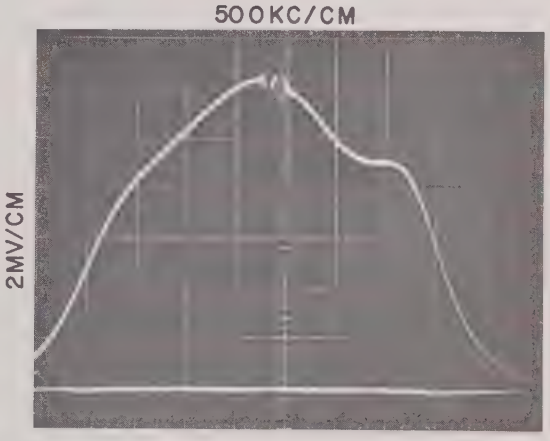


Figure 4-13. Typical Response curve, Over-all Response at 260 mc

4.8 TUNING VOLTAGE ANALOG OUTPUT ALINGMENT

The tuning voltage analog output is aligned as follows:

(1) Connect the VTVM to A4TP1.
(2) Adjust A4R8 to read -12 vdc ±0.5 vdc on the VTVM.
(3) Move the VTVM connection to jack J12, ANALOG TUNING VOLTAGE.
(4) Set the bandswitch to 30-60 MC.
(5) Set tuning dial to 30 mc.
(6) The VTVM should indicate -1.0 vdc ±0.07 vdc.
(7) If the reading in step (6) is not within specified limits, loosen the two Allen head setscrews on the gear mounted on the shaft of R3.

(8) Without moving the dial, rotate the R3 shaft, (using long-nose pliers) until the -1.0 vdc ±0.07 vdc reading is obtained.
(9) Repeat steps (4) through (8) with the bandswitch set to the 54-260 MC position, and the receiver dial set to 54 mc. In this case R4 will be adjusted if necessary.

4.9 SCAN LIMIT SWITCH ADJUSTMENT (SVT-30C ONLY)

The scan limit switch adjustments are made to insure that the tuners will completely cover the entire band, but not hit the mechanical dial stops when using the automatic scan feature. Adjustments are identical for both the high and low bands. However, the bandswitch must be in the position corresponding to the band for the scan limit switch being adjusted. A6 is the reference designation prefix for the high-band switch; the low-band switch is A3. When performing the adjustments, the upper scan limit setting must be performed first. Proceed as follows:

(1) Connect VTVM to A9TP1 and adjust A9R8 for a reading of exactly 24 vdc.
(2) Connect VTVM to A8TP1 and adjust A8R9 for a reading of exactly -24 vdc.
(3) Connect VTVM to A4TP1 and adjust A4R8 for a reading of exactly -12 vdc.
(4) If the low band is being adjusted, tune to 30 mc and check for reading of exactly -1 vdc with VTVM at pin 2 of R3. If this reading is not obtained loosen coupling between R3 and the gear train. Then turn shaft of R3 until correct voltage is obtained. Make sure that the dial is still at 30 mc, then retighten the coupling. If the high band is being adjusted, tune to 54 mc and check for -1 vdc reading at pin 2 of R4. Make the adjustment as described above if the correct reading is not obtained.
(5) Tune to 60 mc for low-band adjustment and check for a reading of -11 vdc at pin 2 of R3. If the high band is being adjusted tune to 260 mc and check for the same reading at pin 2 of R4
(6) Place SCAN SELECT switch in UPPER LIMIT SET position.
(7) Place UPPER LIMIT control in maximum clockwise position.
(8) Tune to midway between the last mark at the high-frequency end of the dial and the mechanical dial stop.
(9) Adjust R3 on the scan limit switch module until the SWEEP DOWN lamp just begins to glow steadily.
(10) Place SCAN LIMIT switch to LOWER LIMIT SET position.
(11) Place LOWER LIMIT control in maximum counterclockwise position.
(12) Tune to midway between last low-frequency mark on dial and the mechanical dial stop.
(13) Adjust R2 on the scan limit switch module until the SWEEP UP lamp just begins to glow steadily.
(14) Return SCAN LIMIT switch to the UPPER LIMIT SET position and retune to the original upper limit setting. Check to see that the SWEEP DOWN lamp comes on at the original point.
(15) Switch to the LOWER LIMIT SET position and retune to the original lower limit setting. Check to see that the SWEEP UP lamp comes on at the original point.

Table 4-1. Typical Tube, Transistor and Module Pin Voltages

Ref Desig.	Type	Pin Number or Element								
		2	Grid 4	Cathode 8	Heater 10	Heater 12	Plate	Emitter	Base	Collector
Q1	2N1544							-5.8	-6.0	-12.7
A1V1	6CW4	62	0.18	56	5.8*	0	--			
A1V2	6CW4	104	59	62	5.8*	0	--			
A1V3	7587	8.7	-0.88	0	5.8*	0	118			
A1V4	6CW4	108	56	56	0	-5 8	--			
A2V1	8058	--	-0.09	0.40	5.7*	0	100			
A2V2	8058	--	-0.03	0.37	5.7*	0	100			
A2V3	7587	22	-0.88	0	5.8*	0	118			
A2V4	6CW4	76	3.0	0	0	-6.0	--			
A6Q1	2N2708							-4.45	-3.75	-0.15
A6Q2	2N706							-3.0	-2.33	-0.28
A6Q3	2N706							-3.0	-2.33	-0.28
A6Q4	2N706							-3.0	-2.33	-0.27
A7Q1	2N3251							0.5	0	-23.6
A7Q2	2N2270							0	0.6	0.37
A8Q1	2N1038							-23.7	-24.0	-29.0
A8Q2	2N1038							-23.7	-24.0	-29.0
A8Q3	2N3251							-6.4	-7.0	-24.0
A9Q1	2N3053							32.0	25.0	24.2
A9Q2	2N2270							25.0	6.6	6.0
A10**										

Type 7963A Scan Limit Switch (A3 and A6) SVT-30C Only

Pin No.	1	2	4	5	10	11	12	13	14	15
Voltage	24.0	23.0	0	-0.18#	-23.5	-0.95#	-3.4	-3.4	-0.25	0

Type 7655A Power Supply Regulator (A4)

Pin No.	1	2	3	4	9
Voltage	0	-12.0	-0.18#	0	-23.5

Type 7611 Power Supply (A5) VT-30C Only

Pin No.	1	2	3	4	5	6	7	8	9	10	11
Voltage	10.6*	10.6*	0	-25.8	-11.6	-138	155*	155*	-6	48	180

Table 4-1. Typical Tube, Transistor and Module Pin Voltages - (Cont'd)

Type 7659A Power Supply (A5) SVT-30C Only

Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Voltage	0	-6.0	13.0*	-12.7	13.0*	53.0	125	146*	175	146*	25.0*	25.0*	-32	32

Test Conditions: Readings are positive dc with respect to ground unless otherwise indicated. Readings taken with RCA WV-98B VTVM with 115 vac applied. Controls set to maximum CW. SCAN SELECT switch in MAN position. Bandswitch in position for tuner being measured.

Notes:

* ac reading
\# reading varies with tuning
** same as A6

Table 4-2. Types VT-30C and SVT-30C Tuners, Troubleshooting Chart

SYMPTON	PROBABLE CAUSE	REMEDY
Unit completely inoperative.	a. No ac input.	a. Check ac source, power cord and POWER switch.
	b. Blown fuse.	b. Replace fuse F1.
	c. Defective power transformer.	c. Check windings for continuity.
Lamps operating, no output either band.	a. Defective power supply module.	a. Check voltages at pins 5, 9, 11 and 4 (pins 4, 2, 9 and 13 on SVT-30C).
	b. Defective 150V regulator.	b. Check voltage at CR1 and CR2. Locate and replace defective components.
	c. Defective -6.3V regulator.	c. Check voltage at C10 on power splitter chassis. Locate and replace defective components.
	d. Defective Power Splitter module.	d. Check for signal at the three outputs. Locate and replace the defective components.
Low band inoperative, high band normal.	a. Defective tube.	a. Check A1V1, A1V2, A1V3 and A1V4. Replace as necessary.
	b. Defective bandswitch.	b. Check voltage at C37 and C45. Repair or replace as necessary.
High band inoperative, low band normal.	a. Defective tube.	a. Check A2V1, A2V2, A2V3 and A2V4. Replace as necessary.
	b. Defective bandswitch.	b. Check voltage at A2C34 and A2C43. Repair or replace as necessary.
	c. Defective AGC module.	c. Check voltage at pin 8 of A7.
Fine tuning inoperative.	a. Voltage regulator circuit defective.	a. Check A5R2 and CR3. Replace faulty components.
	b. Voltage divider circuit open.	b. Check R1 and R2. Replace faulty components.

Table 4-2. Types VT-30C and SVT-30C Tuners. Troubleshooting Chart - (Cont'd)

SYMPTON	PROBABLE CAUSE	REMEDY
No AGC gain control.	a. Defective transistor.	a. Check A7Q1 and A7Q2. Replace if necessary.
Limited AGC control.	a. Defective diode.	a. Check A7CR1, A7CR3 and A7CR4. Replace as necessary.
No analog tuning voltage output.	a Defective power supply regulator.	a. Check voltage (-12V) at XA4 pin 2. Locate and replace faulty component.
Motor drives will not reverse on either band. (SVT-30C only)	a. Defective power supply. b. Defective power supply regulator.	a. Check voltages (-35V and +35V) at XA8 pins 13 and 14. Locate and replace faulty component. b. Check voltages (-24V at pin 11 of XA8; +24V at pin 10 of XA9 and -12V at pin 2 of XA4). Locate and replace faulty component.
Motor drive will not reverse on one band, other band normal. (SVT-30C only)	a. Defective scan limit switch module.	a. Substitute scan limit switch module with module from other band. Check transistors on module and replace as necessary.

SECTION V

REPLACEMENT PARTS LIST

5.1 UNIT NUMBERING METHOD

The unit numbering method of assigning reference designations (electrical symbol numbers) has been used to identify assemblies, subassemblies (and modules), and parts. An example of the unit method follows:

Read from right to left as: First (1) resistor (R) of first (1) subassembly (A)

As shown on the main chassis schematic, components which are an integral part of the main chassis have no subassembly designation.

5.2 REFERENCE DESIGNATION PREFIX

Partial reference designations have been used on the equipment and on the illustrations in this manual. The partial reference designations consist of the class letter(s) and identifying item number. The complete reference designations may be obtained by placing the proper prefix before the partial reference designations. Prefixes are provided on drawing and illustrations following the notation "REF DESIG PREFIX".

5.3 LIST OF MANUFACTURERS

Vendor Code	Name and Address	Vendor Code	Name and Address
01121	Allen-Bradley Company 136 West Greenfield Avenue Milwaukee, Wisconsin	05820	Wakefield Engineering Inc. 139 Foundry Street Wakefield, Massachusetts
01281	TRW Semiconductors, Inc. Lawndale California	07688	Joint Electron Device Engineering Council Washington, D. C.
02114	Ferroxcube Corporation of America Saugerties New York	11139	Deutsch Company Electronic Components Divison Banning, California
02660	Amphenol Connector Division Chicago Illinois	14632	Communication Electronics, Inc. 6006 Executive Boulevard Rockville, Maryland
04013	Taurus Corporation 8 Coryell Street Lambertville, New Jersey	15605	Cutler-Hammer, Inc. 321 North 12th Street Milwaukee, Wisconsin
05587	Couch Ordnance Incorporated 3 Arlington Street North Quincy 71, Massachusetts	18469	Servometer Corporation 82 Industrial East Clifton, New Jersey

Vendor Code	Name and Address
28520	Heyman Mfg. Co. East Michigan Avenue Kenilworth, New Jersey
33173	General Electric Company 316 East 9th Street Owensboro, Kentucky
37942	P. R. Mallory and Company 80 South Gray Street Indianapolis, Indiana
56289	Sprague Electric Company 91 Marshall Street North Adams, Massachusetts
58474	Superior Electric Company 383 Middle Street Bristol, Connecticut
71400	Bussman Manufacturing Company University at Jefferson Street St. Louis, Missouri
71700	Cornish Wire Company 50 Church Street New York, New York
71279	Cambridge Thermionic Corporation 455 Concord Avenue Cambridge, Massachusetts
72136	Electro Motive Manufacturing Co. South Park and John Streets Willimantic, Connecticut
72619	Dialight Corporation 61 Stewart Avenue Brooklyn 37, New York
72982	Erie Technological Products, Inc. 644 West 12th Street Erie, Pennsylvania
73138	Helipot Div. of Beckman Instruments, Inc. Fullerton, California
73899	J. F. D. Electronics Corporation 6101 16th Avenue Brooklyn, New York
76055	Mallory Controls Company Box 231 Frankfort, Indiana
80294	Bourns, Incorporated 6135 Magnolia Avenue Riverside, California
81716	Oak Manufacturing Company Crystal Lake Illinois
81349	Military Specifications Promulgated by Standardization Div. Directorate of Logistic Services DSA, Washington, D. C.
86684	Radio Corporation of America 415 South Fifth Street Harrison, New Jersey
91418	Radio Materials Corporation 4242 West Bryn Mawr Avenue Chicago 46, Illinois
91662	Elco Corporation M Street Below Erie Avenue Philadelphia, Pennsylvania
95121	Quality Components, Inc. St. Marys Pennsylvania
99687	Raytheon Company 55 Chappel Street Newton 58, Massachusetts
99848	Wilco Corporation 546 Drover Street Indianapolis, Indiana

5.4 PARTS LIST

When ordering replacement parts from CEI, specify the type and serial number of the equipment, and the reference designation and description of each part ordered. The Vendors and Vendor Part Numbers listed are included as a guide to the user of the equipment in the field and do not necessarily agree with the parts installed in the equipment. Except in those cases specifically noted, the replacement part may be obtained from any vendor as long as the physical and electrical parameters of the part selected agree with the orginial part.

5.4.1 Type VT-30C VHF Tuner, Main Chassis Components

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
A1	LOW BAND (30-60MC) TUNER	1	7197	14632
A2	HIGH BAND (54-260MC) TUNER	1	71108	14632
A3	NOT USED			
A4	POWER SUPPLY REGULATOR	1	7655A	14632
A5	POWER SUPPLY	1	7611	14632
A6	POWER SPLITTER	1	7913	14632
A7	DELAYED AGC AMPLIFIER	1	7829	14632
C1	CAPACITOR, PAPER FEEDTHRU: .01 μF, 600V	2	102P515	56289
C2	Same as C1			
C3	CAPACITOR, ELECTROLYTIC: 500 μF, 25V	1	43F8123BA2	33173
C4	CAPACITOR, ELECTROLYTIC: 15/15 μF, 350V	1	43F2299BB1	33173
C5	CAPACITOR, ELECTROLYTIC: 500 μF, 50V	1	WP-065	76055
CP1	ADAPTER, TYPE N TO BNC	2	21850	02660
CP2	NOT USED			
CP3	NOT USED			
CP4	Same as CP1			
CR1	DIODE, ZENER	2	1N3011B	07688
CR2	Same as CR1			
CR3	DIODE, ZENER	1	1N979A	07688
DS1	LAMP: 6.3V, .15 Amp	2	47	07688
DS2	Same as DS1			
DS3	LAMP: 6V, .04A	1	345	07688
F1	FUSE: 3AG, Slow-Blow, .3A	1	MDL-3/10	71400
J1	CONNECTOR, JACK N SERIES Part of W1	1	UG1052/U	81349
J2	CONNECTOR Part of CP1	--		
J3	CONNECTOR Part of K2	--		
J4	CONNECTOR, RECEPTACLE, BNC SERIES	2	UG1094/U	81349
J5	CONNECTOR Part of K2	--		
J6	CONNECTOR Part of CP4	--		
J7	CONNECTOR Part of CP4	--		
J8	NOT USED			
J9	CONNECTOR, RECEPTACLE: 19 pin	1	DS0019P	11139
J10	NOT USED			
J11	NOT USED			
J12	Same as J4			

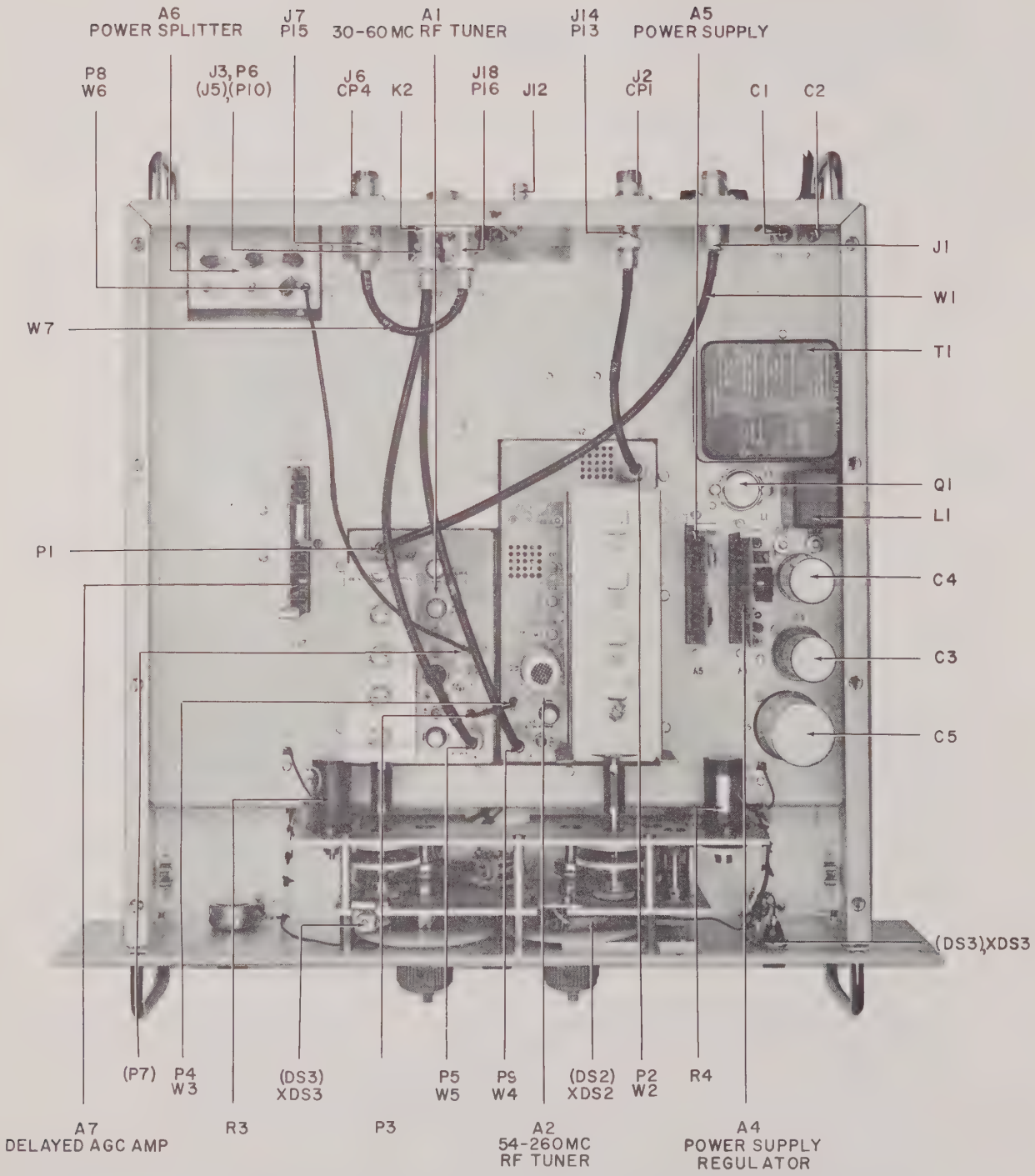


Figure 5-1. Type VT-30C Tuner, Top View

Ref. Desig.	Description		Qty. Per Assy	Vendor Part No.	Vendor Code
J13	NOT USED				
J14	CONNECTOR	Part of CP1	--		
J15	NOT USED				
J16	NOT USED				
J17	NOT USED				
J18	CONNECTOR	Part of K2	--		
K1	NOT USED				
K2	RELAY, COAXIAL		1	315-010002-3	02660
L1	COIL, FIXED		1	1070	14632
P1	PLUG, BNC SERIES	Part of W1	9	UG88/U	81349
P2	Same as P1	Part of W2			
P3	PLUG, SUB-MINIATURE	Part of W3	4	27-7	02660
P4	Same as P3	Part of W3			
P5	Same as P1	Part of W5			
P6	Same as P1	Part of W5			
P7	Same as P3	Part of W6			
P8	Same as P3	Part of W6			
P9	Same as P1	Part of W4			
P10	Same as P1	Part of W4			
P11	POWER CORD AND CABLE		1	01753-001	71700
P12	NOT USED				
P13	Same as P1	Part of W2			
P14	NOT USED				
P15	Same as P1	Part of W7			
P16	Same as P1	Part of W7			
Q1	TRANSISTOR		1	2N1544	07688
R1	RESISTOR, VARIABLE, COMPOSITION: 100 k, 10%, 2W		1	RV4NAYSD104A	81349
R2	RESISTOR, FIXED, COMPOSITION: 5.1 k, 5%, 1/4W		2	CB5125	01121
R3	RESISTOR, VARIABLE, WIRE-WOUND MULTI-TURN: 500 Ω, 3%, 1-1/2W		2	7223-962-1	73138
R4	Same as R3				
R5	RESISTOR, FIXED, COMPOSITION: 2 k, 5%, 2W		2	HB2025	01121
R6	Same as R5				
S1	SWITCH, ROTARY: 8 pole, 2 position		1	399237A	81716
S2	SWITCH, TOGGLE, SPST		1	8280-K16	15605

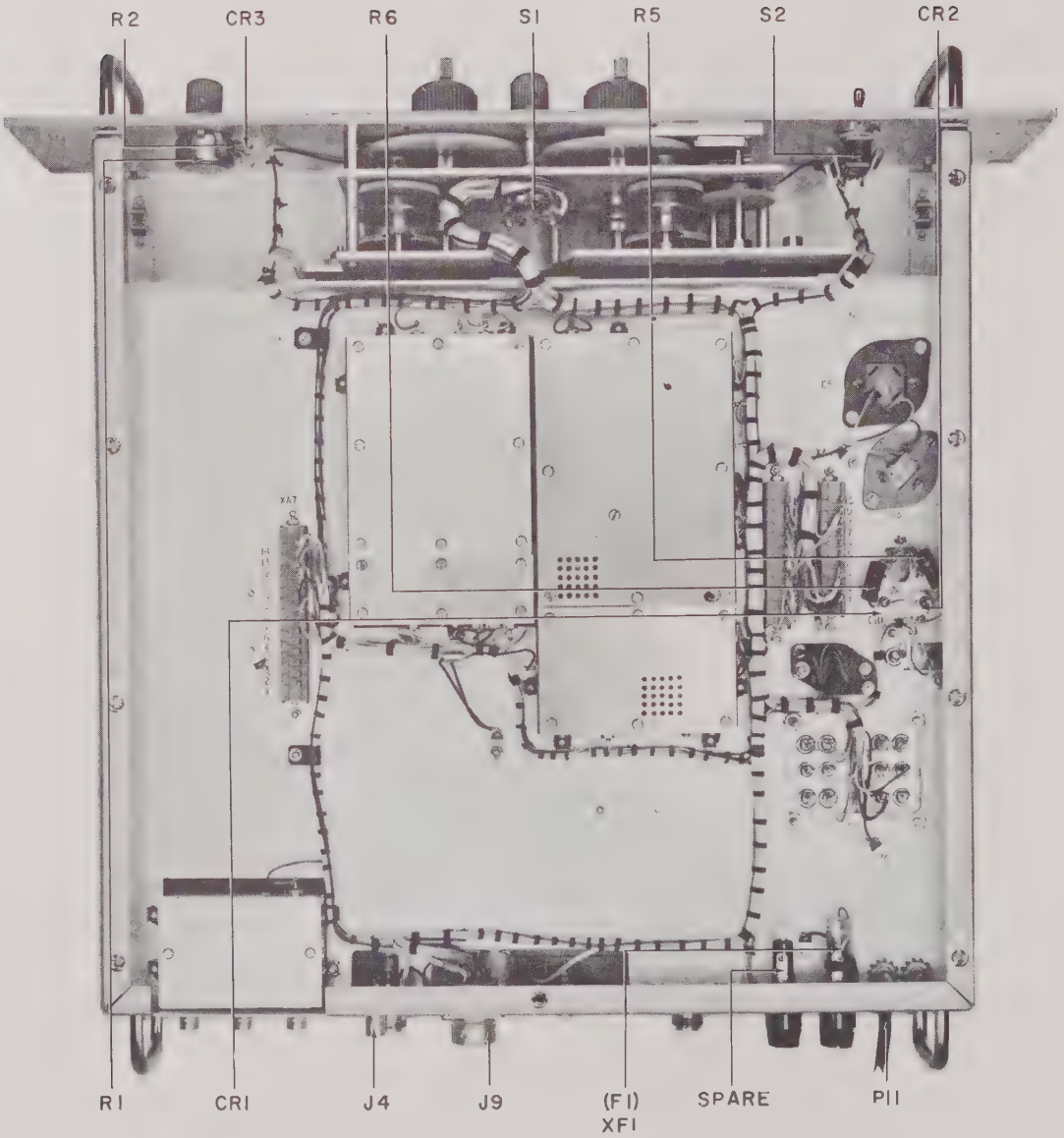


Figure 5-2. Type VT-30C Tuner, Bottom View

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
T1	TRANSFORMER	1	11393-1	14632
W1	CABLE AND CONNECTOR ASSEMBLY	1	30020-91	14632
W2	CABLE AND CONNECTOR ASSEMBLY	1	30020-92	14632
W3	CABLE AND CONNECTOR ASSEMBLY	1	30020-93	14632
W4	CABLE AND CONNECTOR ASSEMBLY	1	30020-94	14632
W5	CABLE AND CONNECTOR ASSEMBLY	1	30020-95	14632
W6	CABLE AND CONNECTOR ASSEMBLY	1	30020-96	14632
W7	CABLE AND CONNECTOR ASSEMBLY	1	30020-97	14632
XA4	CONNECTOR, RECEPTACLE, ELECTRICAL: Printed Circuit Board Type, 10 Contacts.	1	00-5002-010-103-002	91662
XA5	CONNECTOR, RECEPTACLE, ELECTRICAL: Printed Circuit Board Type, 11 Contacts.	1	00-5002-011-103-002	91662
XA7	CONNECTOR, RECEPTACLE, ELECTRICAL: Printed Circuit Board Type, 14 Contacts.	1	0(`2-014-103-002	91662
XF1	FUSE HOLDER	2	HKP	71400
	DUST COVER, MAIN CHASSIS, TOP	1	2979-1	14632
	DUST COVER, MAIN CHASSIS, BOTTOM	1	2978-1	14632
	HANDLE, ROUND NICKEL PLATED BRASS (Rear)	2	1250-1	71279
	HANDLE, ROUND NICKEL PLATED BRASS (Front)	2	1252-1	71279
	KNOB, ROUND, GRAY	2	1073-1	14632
	KNOB, ROUND, GRAY	2	1028-1	14632
	BUSHING, STRAIN RELEIF	1	SR-5P	28520
	CLIP, P. C. RETAINER	3	12746	14632
	COUPLING, BELLOWS TYPE (Gear train to tuner)	2	FC-9	18469

5.4.2 Type SVT-30C VHF Tuner, Main Chassis Components

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
A1	30-60 MC RF TUNER	1	7197	14632
A2	54-260 MC RF TUNER	1	71108	14632
A3	SCAN LIMIT SWITCH	2	7963	14632
A4	POWER SUPPLY REGULATOR	1	7655A	14632
A5	POWER SUPPLY	1	7659A	14632
A6	Same as A3			
A7	DELAYED AGC AMPLIFIER	1	7829	14632
A8	POWER SUPPLY REGULATOR	1	7657	14632
A9	POWER SUPPLY REGULATOR	1	7656A	14632
A10	POWER SPLITTER	1	7913	14632
B1	MOTOR, SYNCHRONOUS	2	SS25	58474
B2	Same as B1			
C1	CAPACITOR, PAPER, THRU-PASS: .01 μF, 600V	2	102P515	56289
C2	Same as C1			
C3	CAPACITOR, ELECTROLYTIC: 500 μF, 25V	1	43F8123BA2	33173
C4	CAPACITOR, ELECTROLYTIC: 15/15 μF, 350V	1	43F2299BB1	33173
C5	CAPACITOR, ELECTROLYTIC: 500 μF, 50V	2	WP-065	37942
C6	NOT USED			
C7	NOT USED			
C8	NOT USED			
C9	NOT USED			
C10	NOT USED			
C11	NOT USED			
C12	NOT USED			
C13	NOT USED			
C14	NOT USED			
C15	NOT USED			
C16	NOT USED			
C17	NOT USED			
C18	Same as C5			
C19	CAPACITOR, ELECTROLYTIC: 75 μF, 300 VAC	2	C-SS25	58474
C20	Same as C19			
C21	CAPACITOR, CERAMIC, DISC: .05 μF, 20%, 50V	2	55C23A1	56289
C22	Same as C21			
C23	CAPACITOR, ELECTROLYTIC, TANTALUM: .47 μF, 10%, 35V	2	150D474X9035A2	56289

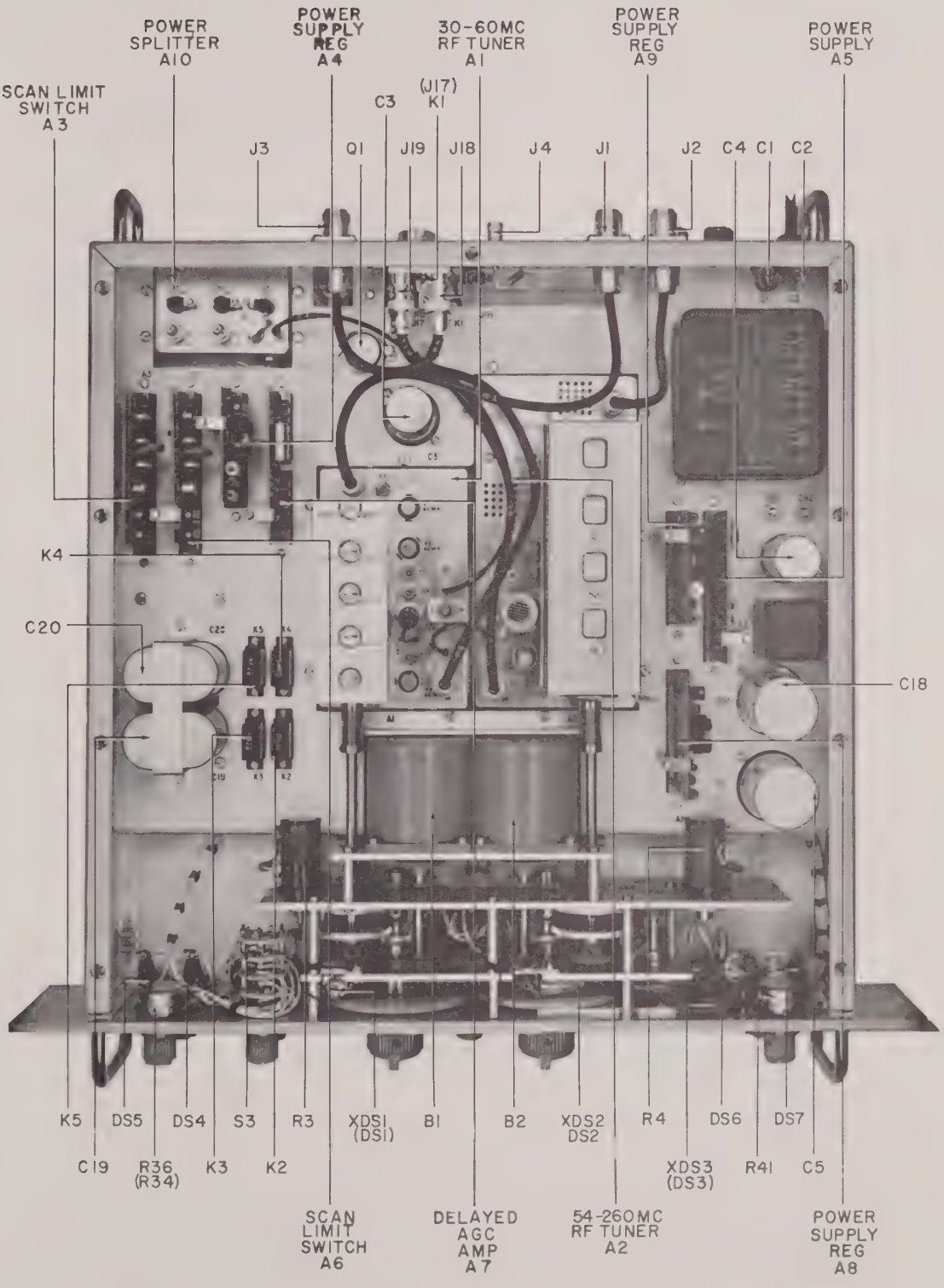


Figure 5-3. Type SVT-30C Tuner, Top View

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
C24	Same as C23			
CR1	DIODE	2	1N3011B	07688
CR2	Same as CR1			
CR3	DIODE	1	1N979A	07688
DS1	LAMP, 6.3V, .15 Amp	2	47	07688
DS2	Same as DS1			
DS3	LAMP, 6V, .04 Amp	1	345	07688
DS4	LAMP	4	249-7841-931	72619
DS5	Same as DS4			
DS6	Same as DS4			
DS7	Same as DS4			
F1	FUSE, 3AG, Slow-Blow, .5 Amp	1	MDL-1/2	71400
J1	CONNECTOR, JACK, N SERIES Part of W1	3	UG1052/U	81349
J2	Same as J1 Part of W2			
J3	Same as J1 Part of W7			
J4	CONNECTOR, RECEPTACLE, BNC SERIES	2	UG1094/U	81349
J5	NOT USED			
J6	NOT USED			
J7	NOT USED			
J8	NOT USED			
J9	CONNECTOR, RECEPTACLE, 19 pin	1	DS0019P	11139
J10	NOT USED			
J11	NOT USED			
J12	Same as J4			
J13	NOT USED			
J14	NOT USED			
J15	NOT USED			
J16	NOT USED			
J17	CONNECTOR, BNC Part of K1	--		
J18	Same as J17			
J19	Same as J17			
K1	RELAY, COAXIAL, SP-DT	1	315-010002-3	02660
K2	RELAY, 25 MW, 6250 Ω	4	2W02A470B	05587
K3	Same as K2			
K4	Same as K2			

Figure 5-4

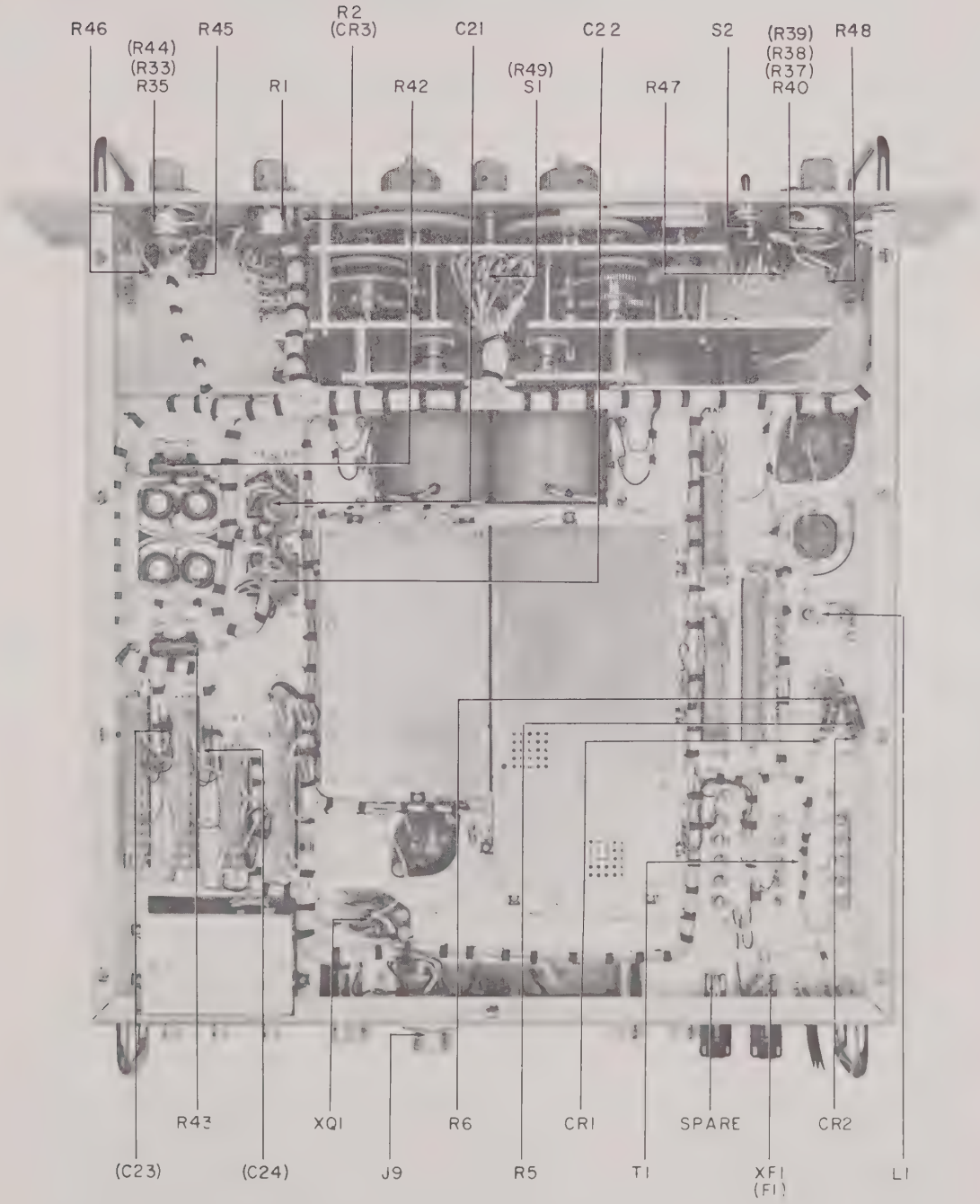


Figure 5-4. Type SVT-30C Tuner, Bottom View

Ref Desig	Description		Qty. Per Assy	Vendor Part No.	Vendor Code
K5	Same as K2				
L1	COIL, FIXED		1	1070	14632
P1	PLUG, BNC SERIES	Part of W1	7	UG88/U	81349
P2	Same as P1	Part of W2			
P3	PLUG, SUB-MINIATURE	Part of W3	4	27-7	02660
P4	Same as P3	Part of W3			
P5	Same as P1	Part of W5			
P6	Same as P1	Part of W7			
P7	Same as P3	Part of W6			
P8	Same as P3	Part of W6			
P9	Same as P1	Part of W4			
P10	NOT USED				
P11	POWER CORD AND CABLE		1	01753-001	71700
P12	Same as P1	Part of W4			
P13	Same as P1	Part of W5			
Q1	TRANSISTOR		1	2N1544	07688
R1	RESISTOR, VARIABLE, COMPOSITION: 100 k, 10%, 2W		1	RV4NAYSD104A	81349
R2	RESISTOR, FIXED, COMPOSITION: 5.1 k, 5%, 1/4W		1	CB5125	01121
R3	RESISTOR, VARIABLE, WIRE-WOUND: 500 Ω, 3%, 1-1/2W		2	7223-962-1	73138
R4	Same as R3				
R5	RESISTOR, FIXED, COMPOSITION: 2 k, 5%, 2W		2	HB2025	01121
R6	Same as R5				
R7	NOT USED				
R8	NOT USED				
R9-R32	NOT USED				
R33	RESISTOR, FIXED, COMPOSITION: 20 Ω, 5%, 1/4W		4	CB2005	01121
R34	Same as R33				
R35	RESISTOR, VARIABLE, COMPOSITION: 10 k, 10%, 2W		4	RV4NAYSD103A	81349
R36	Same as R35				
R37	RESISTOR, FIXED, COMPOSITION: 10 k, 5%, 1/4W		2	CB1035	01121
R38	Same as R33				
R39	Same as R33				
R40	Same as R35				
R41	Same as R35				

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
R42	RESISTOR, FIXED, WIRE-WOUND: 500 Ω, 5%, 5W	2	R-SS25	58474
R43	Same as R42			
R44	Same as R37			
R45	RESISTOR, FIXED, COMPOSITION: 100 k, 5%, 1/4W	4	CB1045	01121
R46	Same as R45			
R47	Same as R45			
R48	Same as R45			
R49	RESISTOR, FIXED, COMPOSITION: 1 k, 5%, 1/4W	1	CB1025	01121
S1	SWITCH, ROTARY: 8 pole, 2 position	1	399237A	81716
S2	SWITCH, TOGGLE, SPST	1	8280-K16	15605
S3	SWITCH, ROTARY: 8 pole, 4 position	1	01-082-04-07-1-00-1-413A	81716
T1	TRANSFORMER	1	11481	14632
W1	CABLE AND CONNECTOR ASSEMBLY	1	30020-496	14632
W2	CABLE AND CONNECTOR ASSEMBLY	1	30020-497	14632
W3	CABLE AND CONNECTOR ASSEMBLY	1	30020-498	14632
W4	CABLE AND CONNECTOR ASSEMBLY	1	30020-499	14632
W5	CABLE AND CONNECTOR ASSEMBLY	1	30020-500	14632
W6	CABLE AND CONNECTOR ASSEMBLY	1	30020-501	14632
W7	CABLE AND CONNECTOR ASSEMBLY	1	30020-502	14632
XA3	CONNECTOR, RECEPTACLE, ELECTRICAL: Printed Circuit Board Type, 15 Contacts.	2	00-5003-015-103-002	91662
XA4	CONNECTOR, RECEPTACLE, ELECTRICAL: Printed Circuit Board Type, 10 Contacts.	2	00-5002-010-103-002	91662
XA5	CONNECTOR, RECEPTACLE, ELECTRICAL: Printed Circuit Board Type, 14 Contacts.	2	00-5002-014-103-002	91662
XA6	Same as XA3			
XA7	Same as XA5			
XA8	CONNECTOR, RECEPTACLE, ELECTRICAL: Printed Circuit Board Type, 11 Contacts	1	00-5002-011-103-002	91662
XA9	Same as XA4			
XF1	FUSEHOLDER	2	HKP	71400
	DUST COVER, MAIN CHASSIS, TOP	1	2979-1	14632
	DUST COVER, MAIN CHASSIS, BOTTOM	1	2978-1	14632
	HANDLE, ROUND NICKEL PLATED BRASS (Rear)	2	1250-1	71279
	HANDLE, ROUND NICKEL PLATED BRASS (Front)	2	1252-1	71279
	KNOB, ROUND, GRAY	2	1073-1	14632

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
	KNOB, ROUND, GRAY	7	1028-1	14632
	BUSHING, STRAIN RELEIF	1	SR-5P	28520
	CLIP, P. C. RETAINER	8	12746	14632
	COUPLING, BELLOWS TYPE (Gear train to tuner)	2	FC-9	18469

5.4.3 Type 7197 30-60 MC Tuner

REF DESIG PREFIX A1

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
C1	CAPACITOR, DIPPED MICA: 15 pF, 5%, 500V	1	DM10-150J	72136
C2	CAPACITOR, DIPPED MICA: 22 pF, 5%, 500V	2	DM10-220J	72136
C3	CAPACITOR, VARIABLE, TRIMMER: 0.7-9 pF	4	VC26G	73899
C4	CAPACITOR, DIPPED MICA: 270 pF, 5%, 500V	2	DM10-271J	72136
C5	CAPACITOR, CERAMIC DISC: 1000 pF, GMV, 500V	15	SM(.001 μF, GMV)	91418
C6	CAPACITOR, CERAMIC, TUBULAR: 0.33 pF, 10%, 500V	1	QC(.33 pF, 10%)	95121
C7	CAPACITOR, CERAMIC TUBULAR: 1.5 pF, ±0.25 pF, 500V	1	301-000-COKO-159C	72982
C8	Same as C5			
C9	Same as C5			
C10	Same as C5			
C11	Same as C4			
C12	CAPACITOR, DIPPED MICA: 18 pF, 5%, 500V	1	DM10-180J	72136
C13	Same as C3			
C14	CAPACITOR, CERAMIC, TUBULAR: 2.7 pF, ±0.25 pF, 500V	1	301-000-COJO-279C	72982
C15	Same as C3			
C16	CAPACITOR, DIPPED MICA: 12 pF, 5%, 500V	1	DM10-120J	72136
C17	CAPACITOR, DIPPED MICA: 47 pF, 5%, 500V	1	DM10-470J	72136
C18	CAPACITOR, COMPOSITION, TUBULAR: 1.2 pF, 10%, 500V	1	QC(1.2 pF, 10%)	95121
C19	Same as C5			
C20	Same as C5			
C21	CAPACITOR, CERAMIC, STANDOFF: 1000 pF, GMV, 500V	2	SS5A-102W	01121
C22	CAPACITOR, CERAMIC FEEDTHRU: 330 pF, 10%, 500V	1	FA5C-3311	01121
C23	Same as C5			
C24	Same as C5			
C25	Same as C21			
C26	Same as C5			
C27	Same as C3			
C28	CAPACITOR, DIPPED MICA: 10 pF, 5%, 500V	2	DM10-100J	72136
C29	Same as C2			
C30	Same as C28			
C31	Same as C5			
C32	Same as C5			
C33	Same as C5			

REF DESIG PREFIX A1

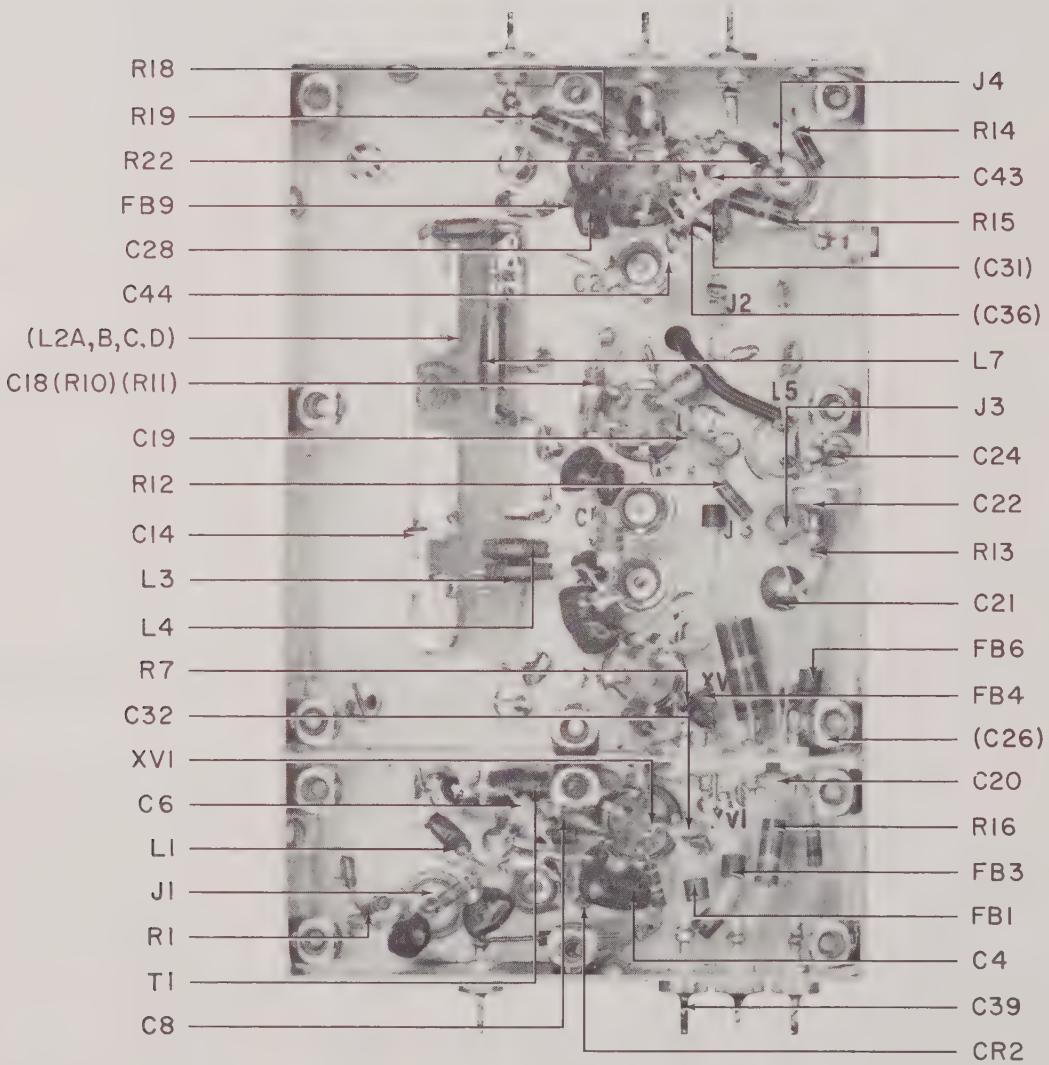


Figure 5-5. Type 7197 30-60 mc Tuner, Component Locations

REF DESIG PREFIX A1

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
C34	Same as C5			
C35	Same as C5			
C36	Same as C5			
C37	CAPACITOR, CERAMIC, FEEDTHRU: 1000 pF, GMV, 500V	7	FA5C-102W	01121
C38	Same as C37			
C39	Same as C37			
C40	Same as C37			
C41	Same as C37			
C42	Same as C37			
C43	CAPACITOR, CERAMIC TUBULAR: 2.0 pF, ±.25 pF, 500V	1	301-000-COKO-209C	72982
C44	CAPACITOR, CERAMIC TUBULAR: 1.2 pF, ±.25 pF, 500V	1	301-000-COKO-129C	72982
C45	Same as C37			
C46	CAPACITOR, COMPOSITION, TUBULAR: .82 pF, 10%, 500V	1	QC(.82 pF, 10%)	95121
CR1	DIODE, CAPACITOR,	1	V27E	
CR2	DIODE	1	1N995	07688
FB1	FERRITE BEAD	9	56-590-65/4A	02114
FB2	Same as FB1			
FB3	Same as FB1			
FB4	Same as FB1			
FB5	Same as FB1			
FB6	Same as FB1			
FB7	Same as FB1			
FB8	Same as FB1			
FB9	Same as FB1			
J1	CONNECTOR, RECEPTACLE, BNC	2	UG1094/U	81349
J2	CONNECTOR, RECEPTACLE, SUB-MINIATURE	2	27-9	02660
J3	Same as J2			
J4	Same as J1			
L1	COIL, FIXED	3	1131-06	14632
L2	TUNER, FOUR SECTION INDUCTUNER	1	2026	14632
L3	Same as L1			
L4	Same as L1			
L5	COIL, ADJUSTABLE	1	1472-3	14632
L6	COIL	1	1131-07	14632

REF DESIG PREFIX A1

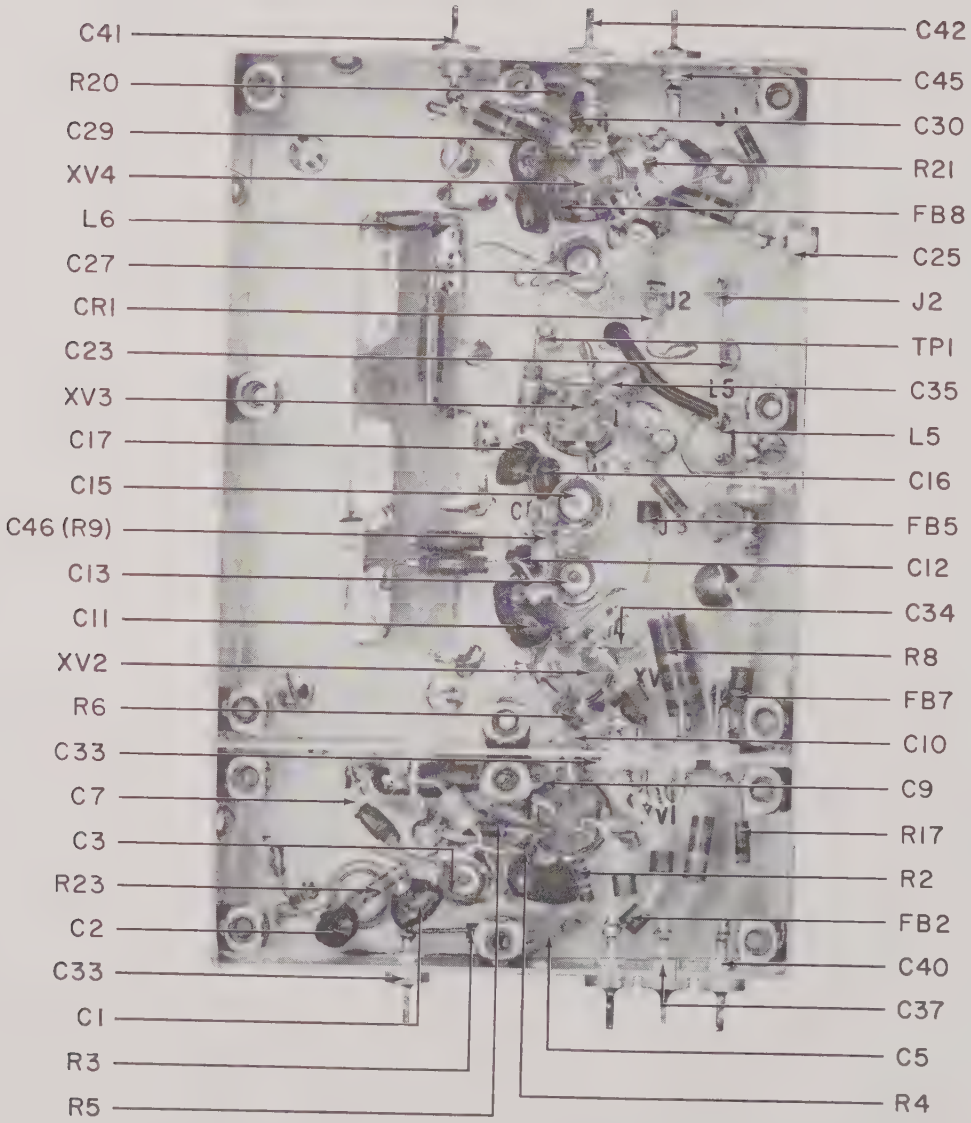


Figure 5-6. Type 7197 30-60 mc Tuner, Component Locations

REF DESIG PREFIX A1

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
L7	COIL	1	1131-08	14632
R1	RESISTOR, FIXED, COMPOSITION: 390 Ω, 5%, 1/4W	1	CB3915	01121
R2	RESISTOR, FIXED, COMPOSITION: 47 k, 5%, 1/4W	3	CB4735	01121
R3	RESISTOR, FIXED, COMPOSITION: 270 k, 5%, 1/4W	1	CB2745	01121
R4	RESISTOR, FIXED, COMPOSITION: 300 Ω, 5%, 1/4W Nominal Value: Final Value Factory Selected.	1	CB3015	01121
R5	RESISTOR, FIXED, COMPOSITION: 150 Ω, 5%, 1/4W	1	CB1515	01121
R6	Same as R2			
R7	RESISTOR, FIXED, COMPOSITION: 10 Ω, 5%, 1/4W	1	CB1005	01121
R8	RESISTOR, FIXED, COMPOSITION: 6.8 k, 5%, 1W	1	GB6825	01121
R9	RESISTOR, FIXED, COMPOSITION: 4.7 k, 5%, 1/4W	1	CB4725	01121
R10	RESISTOR, FIXED, COMPOSITION: 470 k, 5%, 1/4W	1	CB4745	01121
R11	Same as R10			
R12	RESISTOR, FIXED, COMPOSITION: 1.2 M, 5%, 1/4W	1	CB1255	01121
R13	RESISTOR, FIXED, COMPOSITION: 33 k, 5%, 1/4W	1	CB3335	01121
R14	RESISTOR, FIXED, COMPOSITION: 1 k, 5%, 1/4W	2	CB1025	01121
R15	RESISTOR, FIXED, COMPOSITION: 10 k, 5%, 1/2W	1	EB1035	01121
R16	RESISTOR, FIXED, COMPOSITION: 2.7 k, 5%, 1/2W	1	EB2725	01121
R17	Same as R14			
R18	Same as R2			
R19	RESISTOR, FIXED, COMPOSITION: 22 k, 5%, 1/2W	1	EB2235	01121
R20	RESISTOR, FIXED, COMPOSITION: 1.5 M, 5%, 1/4W	1	CB1555	01121
R21	RESISTOR, FIXED, COMPOSITION: 100 k, 5%, 1/4W	1	CB1045	01121
R22	RESISTOR, FIXED, COMPOSITION: 51 Ω, 5%, 1/4W	1	CB5105	01121
R23	RESISTOR, FIXED, COMPOSITION: 3.3 k, 5%, 1/4W	1	CB3325	01121
T1	TRANSFORMER	1	1134	14632
TP1	TEST POINT	1	TJ-6	04013
V1	TUBE, ELECTRON, NUVISTOR	3	6CW4	86684
V2	Same as V1			
V3	TUBE, ELECTRON, NUVISTOR	1	7587	86684
V4	Same as V1			
	RF COVER, SMALL	1	1051	14632
	RF COVER, LARGE	1	2009-3	14632

5.4.4 Type 71108 54-260 Tuner

REF DESIG PREFIX A2

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
C1	CAPACITOR, CERAMIC STANDOFF: 1000 pF, GMV, 500V	3	SS5A-102W	01121
C2	CAPACITOR, CERAMIC, TUBULAR: 8.2 pF, ±.5pF, 500V	1	301-000-COHO-829D	72982
C3	CAPACITOR, CERAMIC, TUBLAR: 5.6 pF, ±.5 pF, 500V	1	301-000-COHO-569D	72982
C4	CAPACITOR, DIPPED MICA: 510 pF, 5%, 500V	1	DM15-511J	72136
C5	CAPACITOR, VARIABLE, CERAMIC: 1.5-12.5 pF, 500V	1	CST-50	71279
C6	CAPACITOR, CERAMIC, TUBULAR: 10 pF, ±.5 pF, 500V	1	301-000-COHO-100D	72982
C7	Same as C1			
C8	CAPACITOR, CERAMIC DISC: 1000 pF, GMV, 500V	7	SM(.001 μF, GMV)	91418
C9	CAPACITOR, COMPOSITION, TUBULAR: 2.2 pF, 10%, 500V	1	QC(2.2 pF, 10%)	95121
C10	CAPACITOR, COMPOSITION, TUBULAR: .51 pF, 10%, 500V	1	QC(.51 pF, 10%)	95121
C11	CAPACITOR, VARIABLE, GLASS: .7-9 pF, 750V	4	VC26G	73899
C12	CAPACITOR, COMPOSITION, TUBULAR: .68 pF, 10%, 500V Nominal Value: Final Value Factory Selected.	1	QC(.68 pF, 10%)	95121
C13	CAPACITOR, COMPOSITION, TUBULAR: 1.2 pF, 10%, 500V	3	QC(1.2 pF, 10%)	95121
C14	CAPACITOR, COMPOSITION, TUBULAR: .22 pF, 10%, 500V	1	QC(.22 pF, 10%)	95121
C15	Same as C11			
C16	Same as C1			
C17	Same as C13			
C18	Same as C11			
C19	CAPACITOR, COMPOSITION, TUBULAR: .43 pF, 10%, 500V	1	QC(.43 pF, 10%)	95121
C20	CAPACITOR, CERAMIC, TUBULAR: 4.7 pF, ±.25 pF, 500V	2	301-000-C0H0-479C	72982
C21	CAPACITOR, CERAMIC, TUBULAR: 5.6 pF, ±.25 pF, 500V (TC-N330)	1	301-000-S2J0-569C	72982
C22	Same as C8			
C23	CAPACITOR, CERAMIC, TUBULAR: 5.1 pF, ±.5 pF	1	301-000-COHO-519D	72982
C24	CAPACITOR, CERAMIC FEEDTHRU: 1000 pF, GMV, 500V	10	FA5C-102W	01121
C25	CAPACITOR, CERAMIC, TUBULAR: 3.3 pF, ±.25 pF, 500V	2	301-000-COJO-339C	72982
C26	CAPACITOR, COMPOSITION, TUBULAR: .68 pF, 10%, 500V	1	QC(.68 pF, 10%)	95121
C27	Same as C8			
C28	CAPACITOR, DIPPED MICA: 15 pF, 5%, 500V	1	DM10-150J	72136
C29	Same as C11			
C30	Same as C8			

REF DESIG PREFIX A2

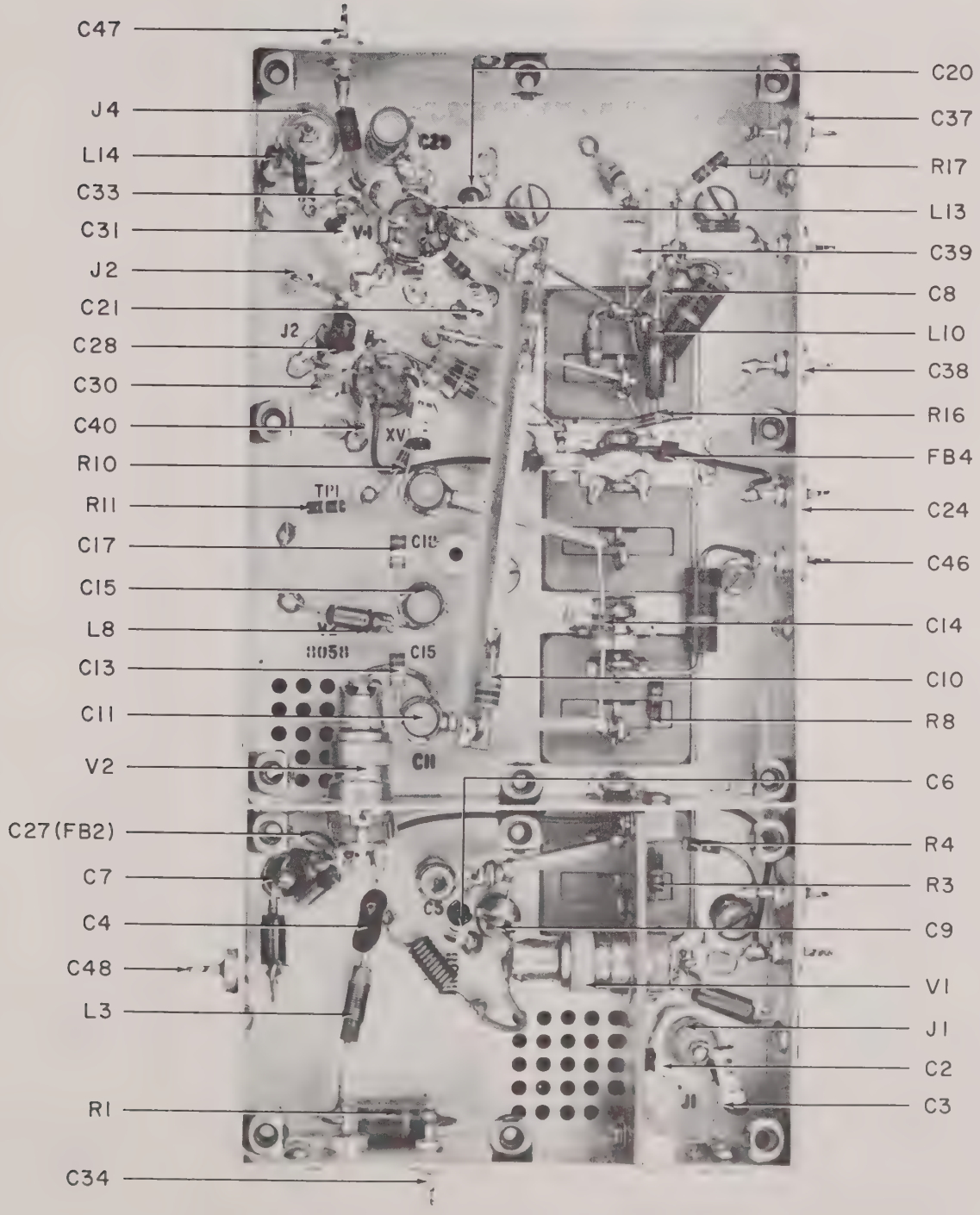


Figure 5-7. Type 71108 54-260 mc Tuner, Component Locations

REF DESIG PREFIX A2

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
C31	Same as C20			
C32	Same as C1			
C33	Same as C13			
C34	Same as C24			
C35	Same as C24			
C36	Same as C24			
C37	Same as C24			
C38	Same as C24			
C39	Same as C25			
C40	Same as C8			
C41	Same as C8			
C42	Same as C8			
C43	Same as C24			
C44	NOT USED			
C45	NOT USED			
C46	Same as C24			
C47	Same as C24			
C48	Same as C24			
CR1	DIODE	1	V27E	01281
FB1	FERRITE BEAD	6	56-590-65/4A	02114
FB2	Same as FB1			
FB3	Same as FB1			
FB4	Same as FB1			
FB5	Same as FB1			
FB6	Same as FB1			
J1	CONNECTOR, RECEPTACLE, BNC SERIES	2	UG1094/U	81349
J2	CONNECTOR, RECEPTACLE, SUB-MINIATURE	1	27-9	02660
J3	NOT USED			
J4	Same as J1			
L1	INDUCTUNER	1	2027-3	14632
L2	COIL, FIXED: 1.8 μH	1	208-11	99848
L3	COIL, FIXED	1	1131-36	14632
L4	COIL, FIXED	1	1129-03	14632
L5	COIL, FIXED	1	10167	14632
L6	COIL, FIXED	1	1131-01	14632

REF DESIG PREFIX A2

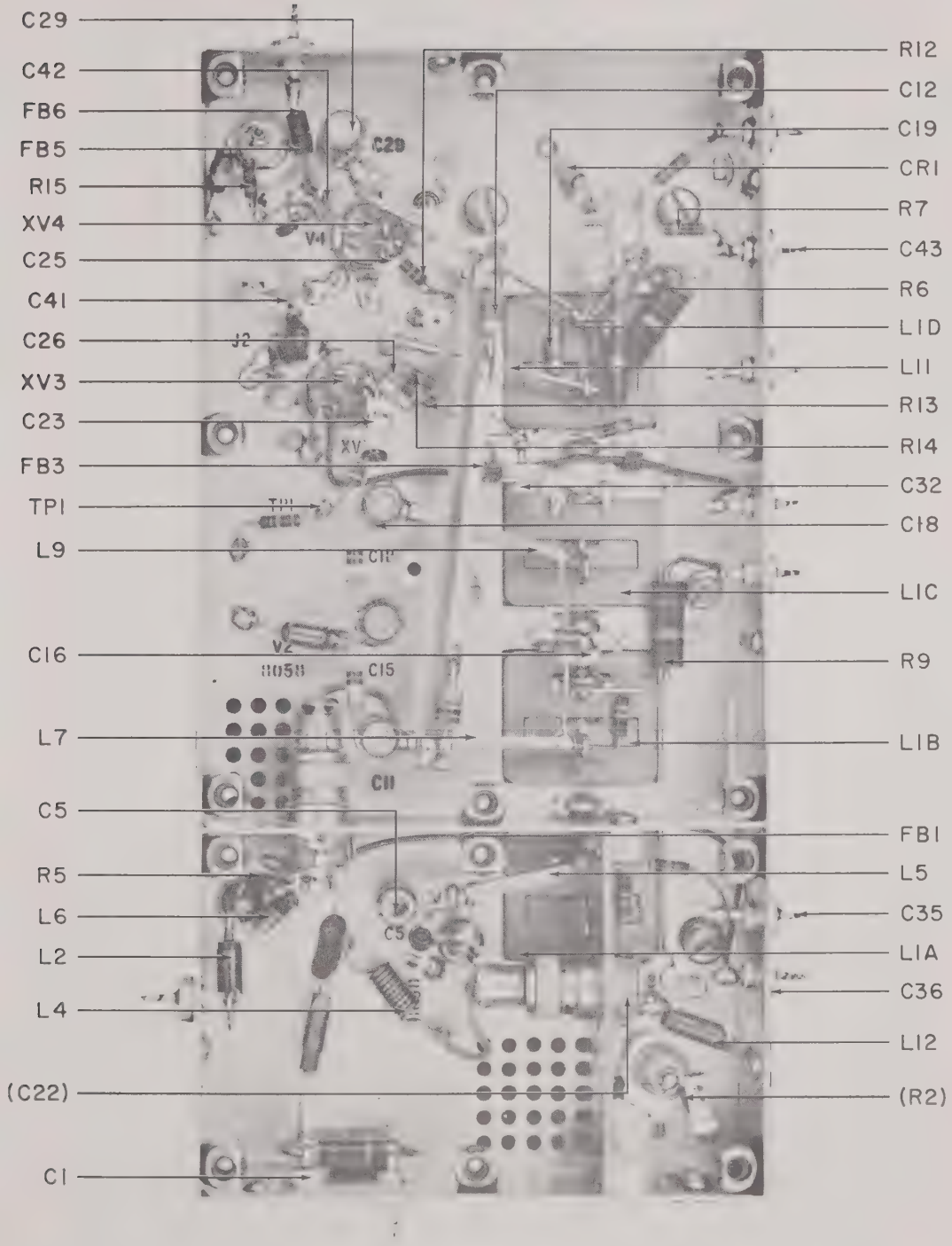


Figure 5-8. Type 71108 54-260 mc Tuner, Component Locations

REF DESIG PREFIX A2

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
L7	COIL, FIXED	1	10166	14632
L8	COIL, FIXED	1	1131-02	14632
L9	COIL, FIXED	1	1200-02	14632
L10	COIL, FIXED	1	1131-28	14632
L11	COIL, FIXED	1	10169	14632
L12	COIL, FIXED	1	1131-4	14632
L13	COIL, FIXED	1	1107-2	14632
L14	COIL, FIXED: .24 μH	1	200-11	99848
R1	RESISTOR, FIXED, COMPOSITION: 4.7 k, 5%, 1W	1	GB4725	01121
R2	RESISTOR, FIXED, COMPOSITION: 100 k, 5%, 1/4W	2	CB1045	01121
R3	RESISTOR, FIXED, COMPOSITION: 20 k, 5%, 1/4W	1	CB2035	01121
R4	RESISTOR, FIXED, COMPOSITION: 300 k, 5%, 1/4W	1	CB3045	01121
R5	RESISTOR, FIXED, COMPOSITION: 510 Ω, 5%, 1/4W	1	CB5115	01121
R6	RESISTOR, FIXED, COMPOSITION: 8.2 k, 5%, 1W	1	GB8225	01121
R7	RESISTOR, FIXED, COMPOSITION: 1 k, 5%, 1/4W	2	CB1025	01121
R8	RESISTOR, FIXED, COMPOSITION: 10 k, 5%, 1/4W	1	CB1035	01121
R9	RESISTOR, FIXED, COMPOSITION: 5.1 k, 5%, 1W	1	GB5125	01121
R10	RESISTOR, FIXED, COMPOSITION: 470 k, 5%, 1/4W	2	CB4745	01121
R11	Same as R10			
R12	RESISTOR, FIXED, COMPOSITION: 47 k, 5%, 1/4W	1	CB4735	01121
R13	RESISTOR, FIXED, COMPOSITION: 510 k, 5%, 1/4W	1	CB5145	01121
R14	RESISTOR, FIXED, COMPOSITION: 6.2k, 5%, 1/4W	1	CB6225	01121
R15	RESISTOR, FIXED, COMPOSITION: 51 Ω, 5%, 1/4W	1	CB5105	01121
R16	Same as R7			
R17	Same as R2			
TP1	TEST POINT	1	TJ6	04013
V1	TUBE, ELECTRON, NUVISTOR	2	8058	86684
V2	Same as V1			
V3	TUBE, ELECTRON, NUVISTOR	1	7587	86684
V4	TUBE, ELECTRON, NUVISTOR	1	6CW4	86684
	RF COVER, SMALL	1	1999	14632
	RF COVER, LARGE	1	2297	14632

5.4.5 7963A Scan Limit Switch, SVT-30C Tuner Only

REF DESIG PREFIX A3 & A6

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
C1	CAPACITOR, CERAMIC, DISC: .1 μF, 20%, 50V	1	33C41A3	56289
CR1	DIODE	4	1N462A	07688
CR2	Same as CR1			
CR3	DIODE	1	1N751A	07688
CR4	Same as CR1			
CR5	Same as CR1			
Q1	TRANSISTOR	2	2N929	07688
Q2	TRANSISTOR	4	2N3251	07688
Q3	Same as Q2			
Q4	TRANSISTOR	1	2N697	07688
Q5	Same as Q2			
Q6	Same as Q2			
Q7	Same as Q1			
R1	RESISTOR, FIXED, COMPOSITION: 3 k, 5%, 1/4W	1	CB3025	01121
R2	RESISTOR, VARIABLE, WIRE-WOUND: 1 k, 10%, 1/2W	2	3067P-1-102	80294
R3	Same as R2			
R4	RESISTOR, FIXED, COMPOSITION: 10 k, 5%, 1/4W	7	CB1035	01121
R5	RESISTOR, FIXED, COMPOSITION: 3.6 k, 5%, 1/4W	1	CB3625	01121
R6	RESISTOR, FIXED, COMPOSITION: 100 k, 5%, 1/4W	2	CB1045	01121
R7	Same as R4			
R8	RESISTOR, FIXED, COMPOSITION: 6.2 k, 5%, 1/4W	1	CB6225	01121
R9	Same as R4			
R10	RESISTOR, FIXED, COMPOSITION: 300 Ω, 5%, 1/4W	1	CB3015	01121
R11	Same as R4			
R12	Same as R4			
R13	Same as R4			
R14	Same as R6			
R15	Same as R4			

REF DESIG PREFIX A3 & A6 (SVT-30C ONLY)

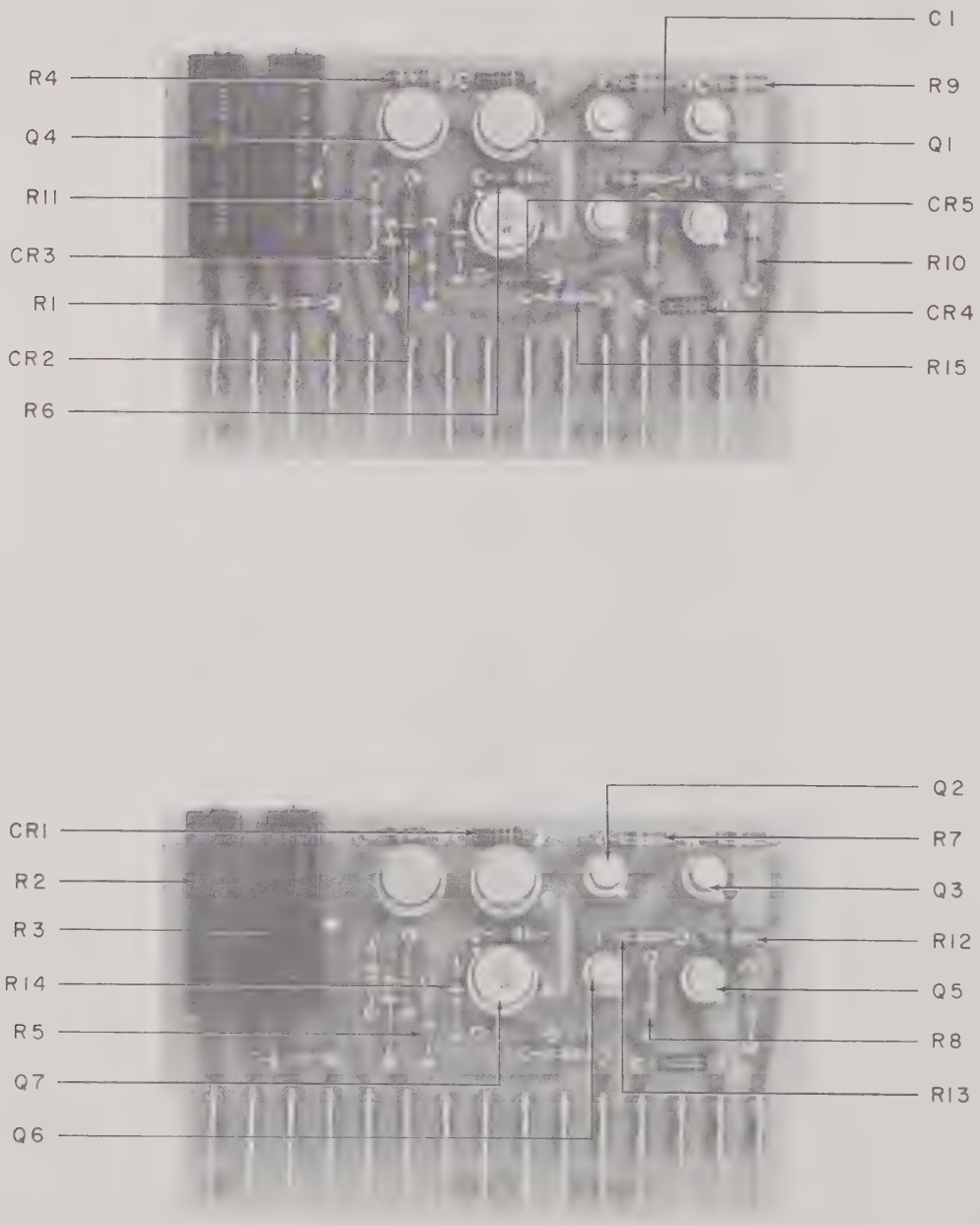


Figure 5-9. Type 7963 Scan Limit Switch, Component Locations

5.4.6 Type 7655A Power Supply Regulator

REF DESIG PREFIX A4

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
C1	CAPACITOR, ELECTROLYTIC, TANTALUM: 22 μF, 10%, 35V	1	150D226X9035R2	56289
CR1	DIODE, ZENER	1	1N753A	07688
CR2	DIODE	1	1N462A	07688
Q1	TRANSISTOR	1	2N1038	07688
Q2	TRANSISTOR	1	2N3251	07688
RA1	HEAT DISSIPATOR	1	NF207	05820
R1	RESISTOR, FIXED, COMPOSITION: 120 Ω, 5%, 1W	1	GB1215	01121
R2	RESISTOR, FIXED, COMPOSITION: 2.4 k, 5%, 1/4W	1	CB2425	01121
R3	RESISTOR, FIXED, COMPOSITION: 1 k, 5%, 1/4W	1	CB1025	01121
R4	RESISTOR, FIXED, COMPOSITION: 56 k, 5%, 1/4W	1	CB5635	01121
R5	RESISTOR, FIXED, COMPOSITION: 5.6 Ω, 5%, 1/4W	1	CB56G5	01121
R6	RESISTOR, FIXED, COMPOSITION: 6.2 k, 5%, 1/4W	1	CB6225	01121
R7	RESISTOR, FIXED, COMPOSITION: 2.2 k, 5%, 1/4W	1	CB2225	01121
R8	RESISTOR, VARIABLE WIRE-WOUND: 1 k, 10%, 1/2W	1	3067P-1-102	80294
R9	RESISTOR, FIXED, COMPOSISTION: 2.7 k, 5%, 1/4W	1	CB2725	01121
TP1	TIP JACK	1	TJ210V	99687
TP2	TIP JACK	1	TJ205BL	99687

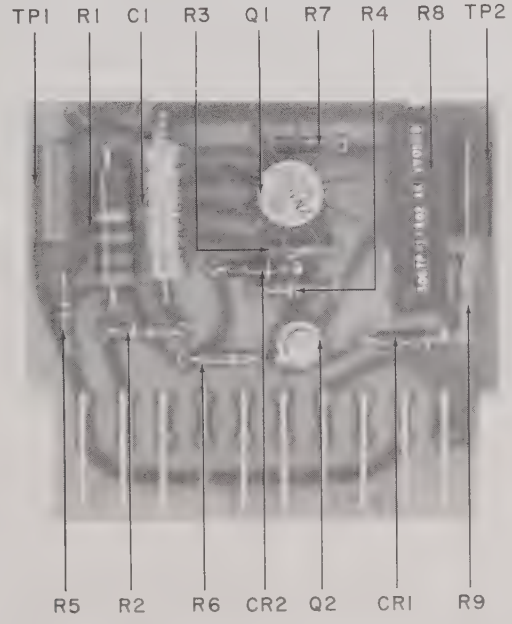


Figure 5-10. Type 7655A Power Supply Regulator, Component Locations

5.4.7 Type 7611 Power Supply Module, VT-30C Tuner Only

REF DESIG PREFIX A5

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
CR1	DIODE	4	1N3253	07688
CR2	Same as CR1			
CR3	Same as CR1			
CR4	Same as CR1			
CR5	DIODE	2	1N3255	07688
CR6	Same as CR5			
CR7	DIODE, ZENER	1	1N753A	07688
R1	RESISTOR, FIXED, COMPOSITION: 430 Ω, 5%, 1/2W	1	EB4315	01121
R2	RESISTOR, FIXED, COMPOSITION: 100 k, 5%, 1/4W	1	CB1045	01121

REF DESIG PREFIX A5 (VT-30C ONLY)

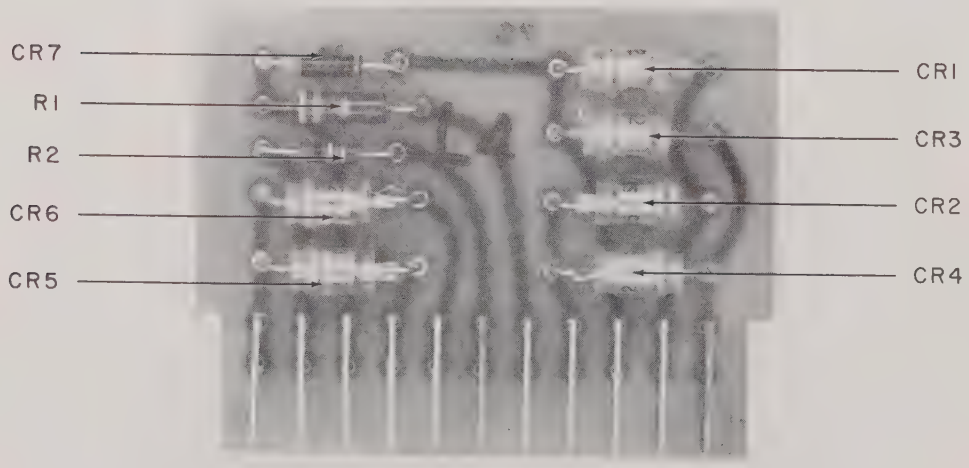


Figure 5-11. Type 7611 Power Supply Module, Component Locations

5.4.8 Type 7659A Power Supply Rectifier, SVT-30C Tuner Only REF DESIG PREFIX A5

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
CR1	DIODE, ZENER	1	1N753A	07688
CR2	DIODE	8	1N3253	07688
CR3	Same as CR2			
CR4	Same as CR2			
CR5	Same as CR2			
CR6	Same as CR2			
CR7	Same as CR2			
CR8	Same as CR2			
CR9	Same as CR2			
R1	RESISTOR, FIXED, COMPOSITION: 430 Ω, 5%, 1/2W	1	EB4315	01121
R2	RESISTOR, FIXED, COMPOSITION: 100 k, 5%, 1/4W	1	CB1045	01121

REF DESIG PREFIX A5 (SVT-30C ONLY)

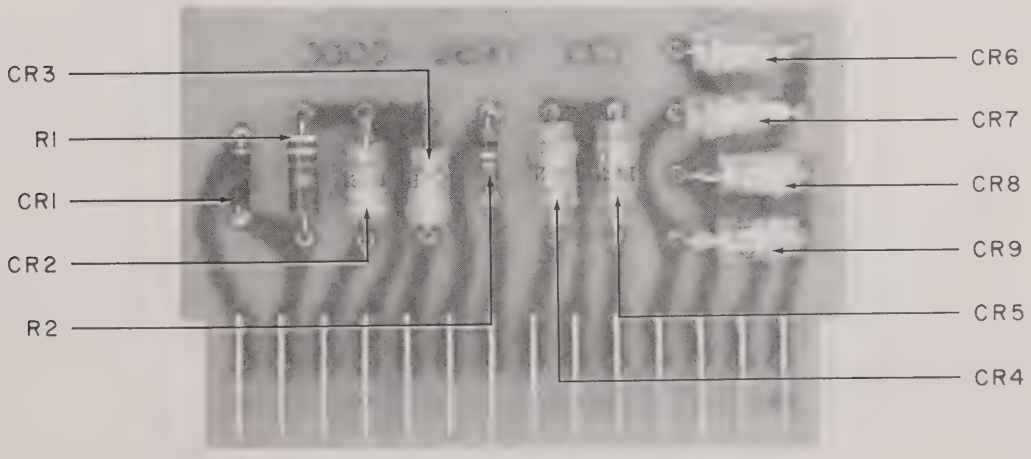


Figure 5-12. Type 7659A Power Supply Module, Component Locations

5.4.9 Type 7913 Shaping Amplifier and Power Splitter

REF DESIG PREFIX A6 (VT-30C)
REF DESIG PREFIX A10 (SVT-30C)

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
C1	CAPACITOR, CERAMIC DISC: 1000 pF, GMV, 500V	6	SM(.001 μF, GMV)	91418
C2	CAPACITOR, DIPPED MICA: 24 pF, 5%, 500V	2	DM10-240J	72136
C3	Same as C1			
C4	CAPACITOR, CERAMIC TUBULAR: 6.2 pF, ±.5 pF, 500V	1	301-000-C0H0-629D	72982
C5	Same as C2			
C6	CAPACITOR, DIPPED MICA: 100 pF, 5%, 500V	2	DM10-101J	72136
C7	Same as C1			
C8	Same as C1			
C9	Same as C1			
C10	Same as C1			
C11	Same as C6			
C12	CAPACITOR, CERAMIC TUBULAR: 2.0 pF, ±.25 pF, 500V	1	301-000-C0K0-209C	72982
J1	CONNECTOR, RECEPTACLE, SUB-MINIATURE	1	27-9	02660
J2	CONNECTOR, RECEPTACLE, BNC SERIES	3	UG1094/U	81349
J3	Same as J2			
J4	Same as J2			
L1	COIL, VARIABLE	2	1472-3	14632
L2	Same as L1			
L3	COIL, FIXED	1	1131-41	14632
Q1	TRANSISTOR	1	2N2708	07688
Q2	TRANSISTOR	3	2N706	07688
Q3	Same as Q2			
Q4	Same as Q2			
R1	RESISTOR, FIXED, COMPOSITION: 51 Ω, 5%, 1/4W	1	CB5105	01121
R2	RESISTOR, FIXED, COMPOSITION: 8.2 k, 5%, 1/4W	1	CB8225	01121
R3	RESISTOR, FIXED, COMPOSITION: 5.1 k, 5%, 1/4W	1	CB5125	01121
R4	RESISTOR, FIXED, COMPOSITION: 47 Ω, 5%, 1/4W	4	CB4705	01121
R5	RESISTOR, FIXED, COMPOSITION: 10 Ω, 5%, 1/4W	1	CB1005	01121
R6	RESISTOR, FIXED, COMPOSITION: 470 Ω, 5%, 1/4W	4	CB4715	01121
R7	RESISTOR, FIXED, COMPOSITION: 4.7 k, 5%, 1/4W	1	CB4725	01121
R8	RESISTOR, FIXED, COMPOSITION: 1 k, 5%, 1/4W	1	CB1025	01121
R9	RESISTOR, FIXED, COMPOSITION: 1.6 k, 5%, 1/4W	1	CB1625	01121
R10	Same as R4			
R11	Same as R4			
R12	Same as R4			

REF DESIG PREFIX A6 (VT-30C)

REF DESIG PREFIX A10 (SVT-30C)

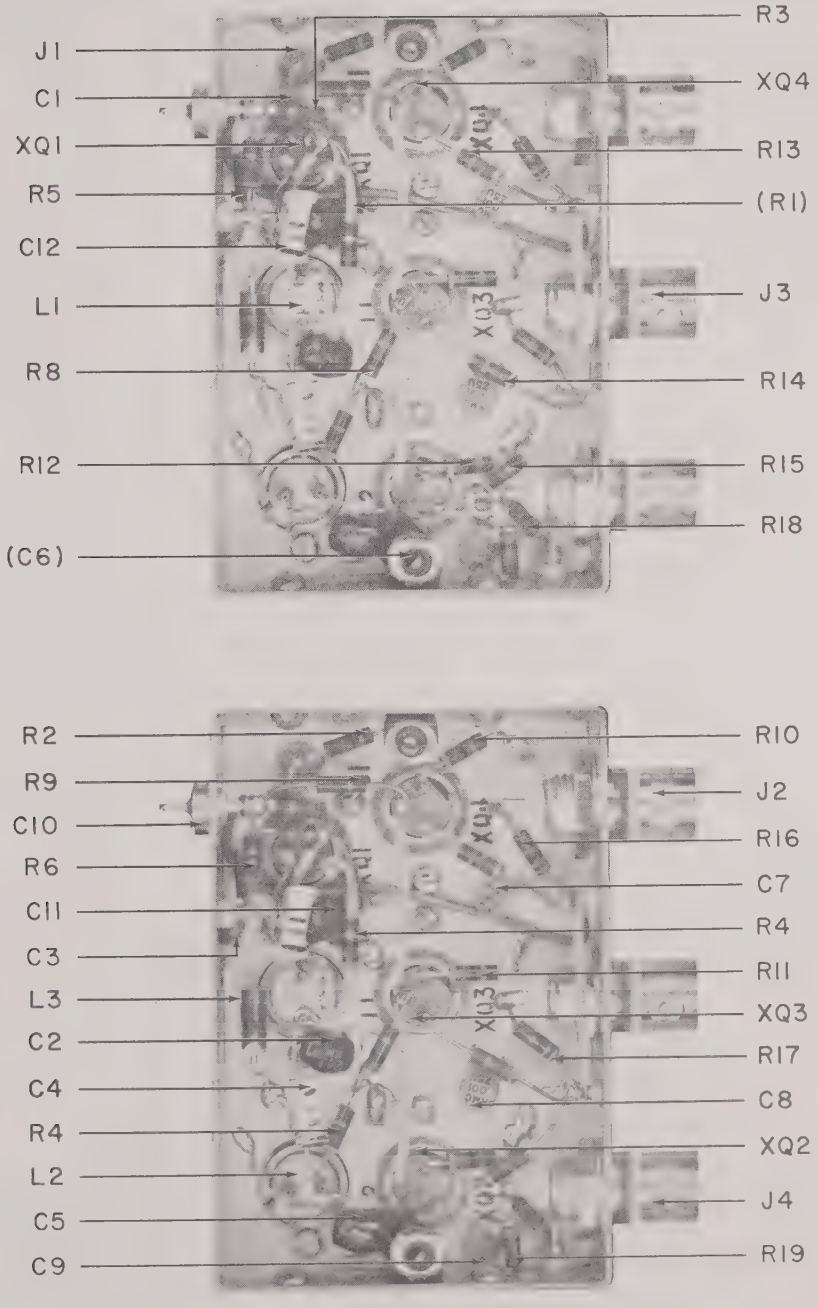


Figure 5-13. Type 7913 Power Splitter, Component Locations

REF DESIG PREFIX A6 (VT-30C)
REF DESIG PREFIX A10 (SVT-30C)

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
R13	Same as R6			
R14	Same as R6			
R15	Same as R6			
R16	RESISTOR, FIXED, COMPOSITION: 43 Ω, 5%, 1/4W	3	CB4305	01121
R17	Same as R16			
R18	RESISTOR, FIXED, COMPOSITION: 430 Ω, 5%, 1/4W	1	CB4315	01121
R19	Same as R16			
	RF COVER	1	10433	14632

5.4.10 Type 7829 Delayed AGC Amplifier

REF DESIG PREFIX A7

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
C1	CAPACITOR, ELECTROLYTIC, TANTALUM: 47 μF, 10%, 35V	1	150D476X9035S2	56289
CR1	DIODE	3	1N462A	07688
CR2	Same as CR1			
CR3	DIODE	1	1N753A	07688
CR4	Same as CR1			
Q1	TRANSISTOR	1	2N3251	07688
Q2	TRANSISTOR	1	2N2270	07688
R1	RESISTOR, FIXED, COMPOSITION: 1M, 5%, 1/4W	1	CB1055	01121
R2	RESISTOR, FIXED, COMPOSITION: 13M, 5%, 1/4W	1	CB1365	01121
R3	RESISTOR, FIXED, COMPOSITION: 1.5M, 5%, 1/4W	1	CB1555	01121
R4	RESISTOR, FIXED, COMPOSITION: 100 k, 5%, 1/4W	1	CB1045	01121
R5	RESISTOR, FIXED, COMPOSITION: 160 k, 5%, 1/4W	1	CB1645	01121
R6	RESISTOR, FIXED, COMPOSITION: 13 k, 5%, 1/4W	1	CB1335	01121
R7	RESISTOR, FIXED, COMPOSITION: 510 Ω, 5%, 1/4W	2	CB5115	01121
R8	Same as R7			
R9	RESISTOR, FIXED, COMPOSITION: 10 k, 5%, 1/4W	1	CB1035	01121
R10	RESISTOR, FIXED, COMPOSITION: 560 Ω, 5%, 1/4W	1	CB5615	01121
R11	RESISTOR, FIXED, COMPOSITION: 1.6 k, 5%, 1/4W	1	CB1625	01121

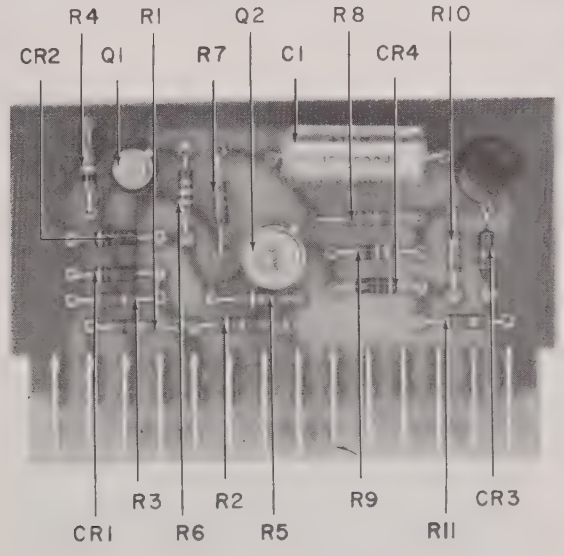


Figure 5-14. Type 7829 Delayed AGC Amplifier, Component Locations

5.4.11 Type 7657 -24V Regulator Board, SVT-30C Tuner Only REF DESIG PREFIX A8

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
C1	CAPACITOR, ELECTROLYTIC, TANTALUM: 22 μF, 10%, 35V	1	150D226X9035R2	56289
CR1	DIODE, ZENER	1	1N753A	07688
CR2	DIODE	1	1N462A	07688
Q1	TRANSISTOR	2	2N1038	07688
Q2	Same as Q1			
Q3	TRANSISTOR	1	2N3251	07688
R1	RESISTOR, FIXED, COMPOSITION: 36 Ω, 5%, 1W	1	GB3605	01121
R2	RESISTOR, FIXED, COMPOSITION: 1 k, 5%, 1/4W	2	CB1025	01121
R3	Same as R2			
R4	RESISTOR, FIXED, COMPOSITION: 75 k, 5%, 1/4W	1	CB7535	01121
R5	RESISTOR, FIXED, COMPOSITION: 5.6 Ω, 5%, 1/4W	2	CB56G5	01121
R6	Same as R5			
R7	RESISTOR, FIXED, COMPOSITION: 18 k, 5%, 1/4W	1	CB1835	01121
R8	RESISTOR, FIXED, COMPOSITION: 9.1 k, 5%, 1/4W	1	CB9125	01121
R9	RESISTOR, VARIABLE, WIRE-WOUND: 1 k, 10%, 1/2W	1	3067P-1-102	80294
R10	RESISTOR, FIXED, COMPOSITION: 2.7 k, 5%, 1/4W	1	CB2725	01121
RA1	RADIATOR, TRANSISTOR	2	NF207	05820
RA2	Same as RA1			
TP1	TEST POINT, VIOLET	1	TJ-210V	99687
TP2	TEST POINT, BLACK	1	TJ-205BL	99687

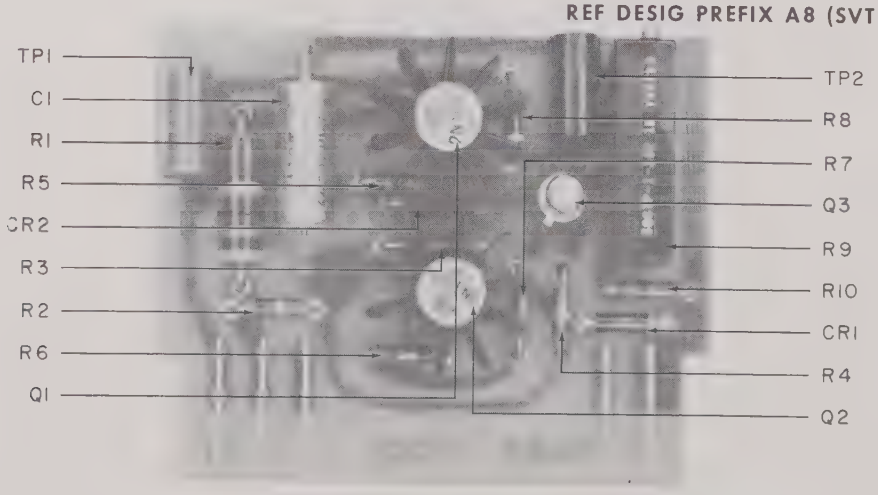


Figure 5-15. Type 7657 Power Supply Regulator, Component Locations

5.4.12 Type 7656A +24V Regulator Board, SVT-30C Tuner Only REF DESIG PREFIX A9

Ref Desig	Description	Qty. Per Assy	Vendor Part No.	Vendor Code
C1	CAPACITOR, ELECTROLYTIC, TANTALUM: 47 μF, 10%, 35V	1	150D476X9035S2	56289
CR1	DIODE, ZENER	1	1N753A	07688
CR2	DIODE	2	1N462A	07688
CR3	Same as CR2			
Q1	TRANSISTOR	2	2N2270	07688
Q2	Same as Q1			
R1	RESISTOR, FIXED, COMPOSITION: 36 Ω, 5%, 1W	1	GB3605	01121
R2	RESISTOR, FIXED, COMPOSITION: 1 k, 5%, 1/4W	2	CB1025	01121
R3	Same as R2			
R4	RESISTOR, FIXED, COMPOSITION: 27 k, 5%, 1/4W	1	CB2735	01121
R5	RESISTOR, FIXED, COMPOSITION: 4.3 Ω, 5%, 1/4W	1	CB43G5	01121
R6	RESISTOR, FIXED, COMPOSITION: 18 k, 5%, 1/4W	1	CB1835	01121
R7	RESISTOR, FIXED, COMPOSITION: 9.1 k, 5%, 1/4W	1	CB9125	01121
R8	RESISTOR, VARIABLE, WIRE-WOUND: 1 k, 10%, 1/2W	1	3067P-1-102	80294
R9	RESISTOR, FIXED, COMPOSITION: 2.4 k, 5%, 1/4W	1	CB2425	01121
RA1	RADIATOR, TRANSISTOR	1	NF207	05820
TP1	TEST POINT, RED	1	TJ-203R	99687
TP2	TEST POINT, BLACK	1	TJ-205BL	99687

REF DESIG PREFIX A9 (SVT-30C ONLY)

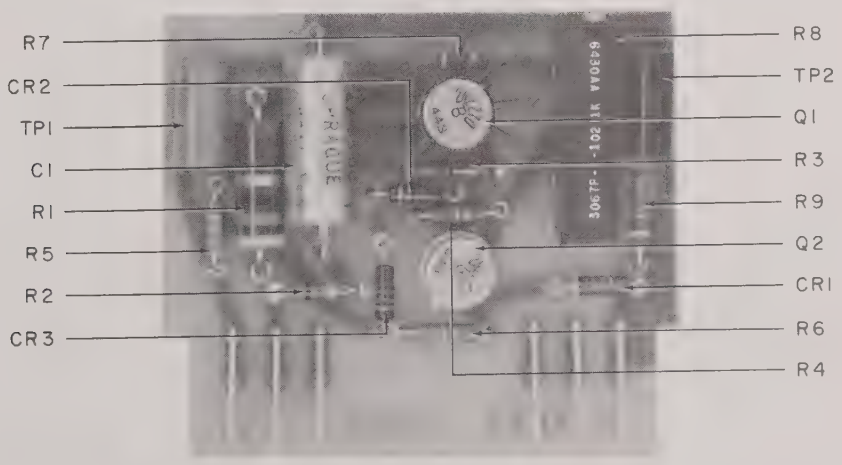


Figure 5-16. Type 7656A Power Supply Regulator, Component Locations

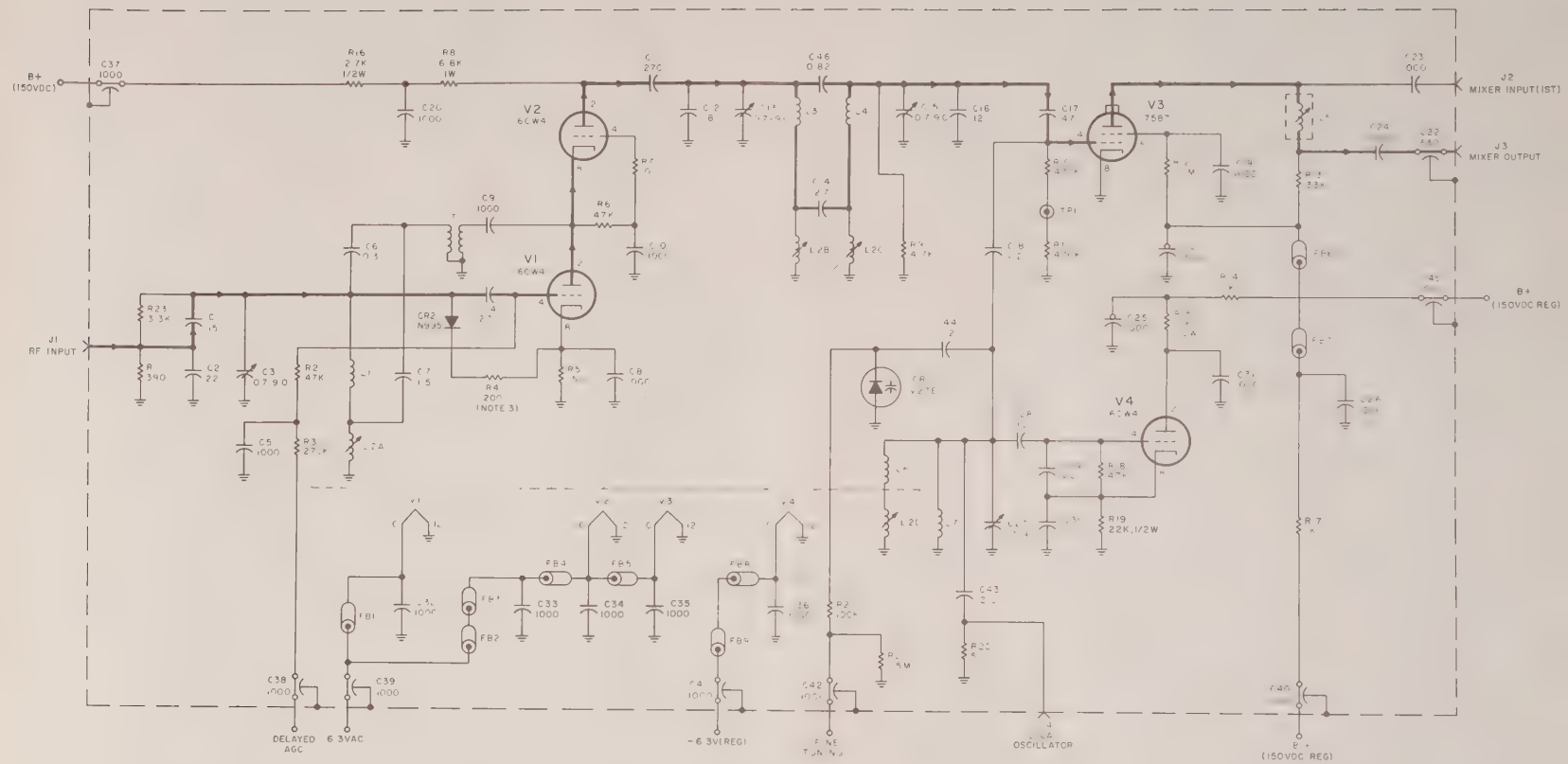
SECTION VI

SCHEMATICS

NOTE

As improved semiconductors become available it is the policy of CEI to incorporate them in proprietary products. For this reason some transistors and diodes installed in an equipment may not agree with those specified in the parts lists and schematic diagrams of this manual. However, the semiconductors designated in the manual may be substituted in every case with satisfactory results.

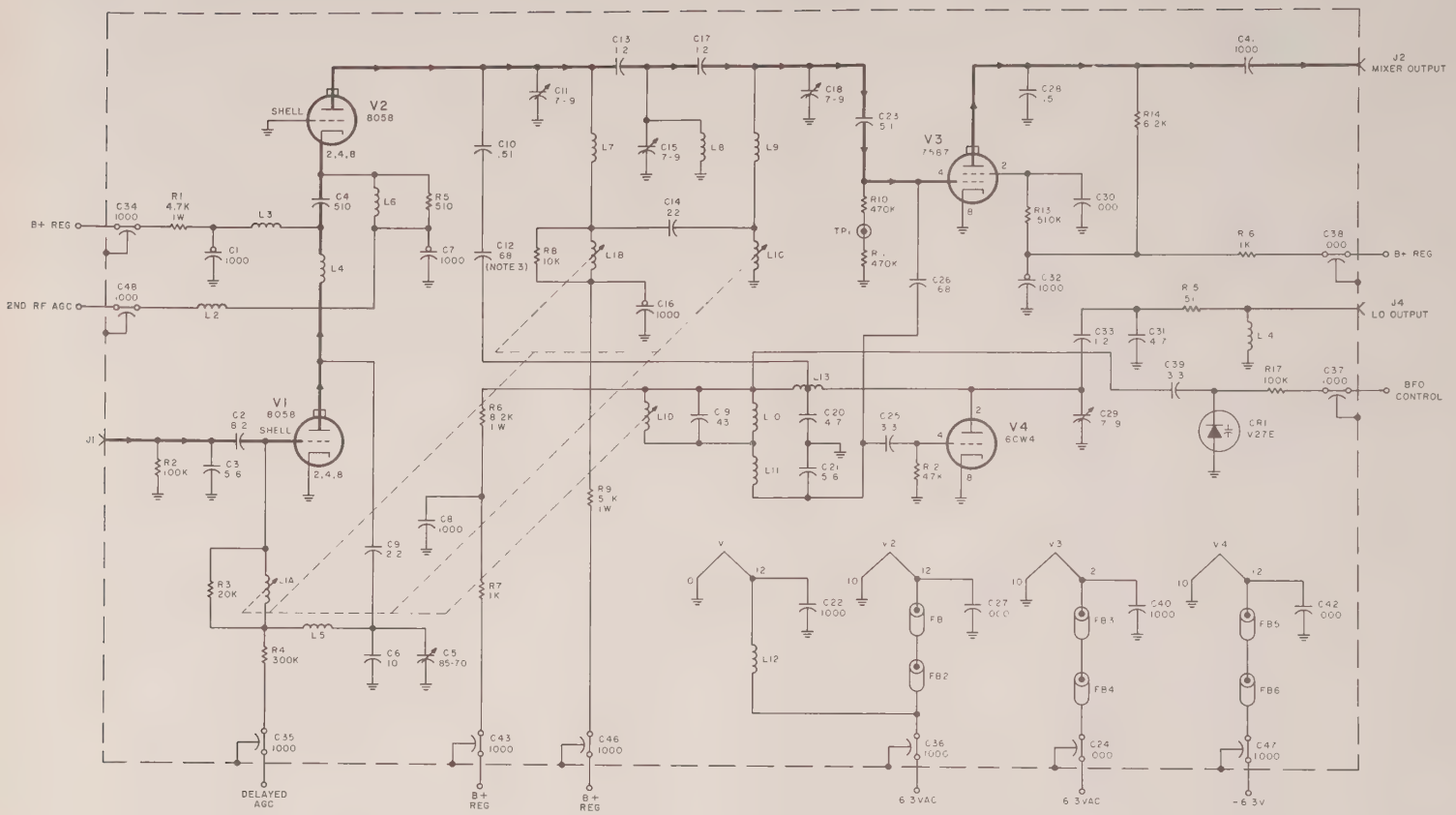
REF DESIG PREFIX A1



NOTES
1. UNLESS OTHERWISE SPECIFIED
   a) RESISTANCE IS MEASURED IN OHMS
   b) CAPACITANCE IS MEASURED IN pf
2. HEAVY LINE DENOTES MAIN SIGNAL PATH
3. VALUE SHOWN IS NOMINAL, FINAL VALUE FACTORY SELECTED

Figure 6-1. Type 7197 30-60 MC Tuner, Schematic Diagram

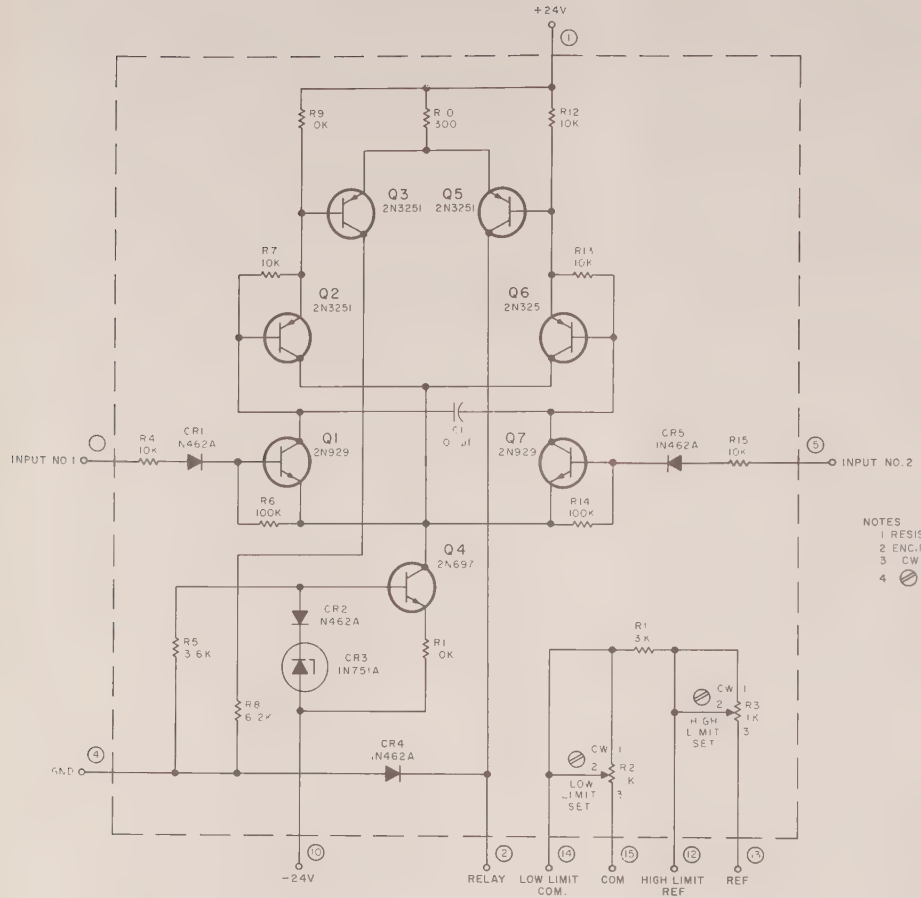
REF DESIG PREFIX A2



NOTES
1 UNLESS OTHERWISE SPECIFIED
a) RESISTANCE IS MEASURED IN OHMS, ±5%, 1/4W
b) CAPACITANCE IS MEASURED IN pf
2 HEAVY LINE DENOTES MAIN SIGNAL PATH
3 NOMINAL VALUE, FINAL VALUE IS FACTORY SELECTED

Figure 6-2. Type 71108 54-260 Tuner, Schematic Diagram

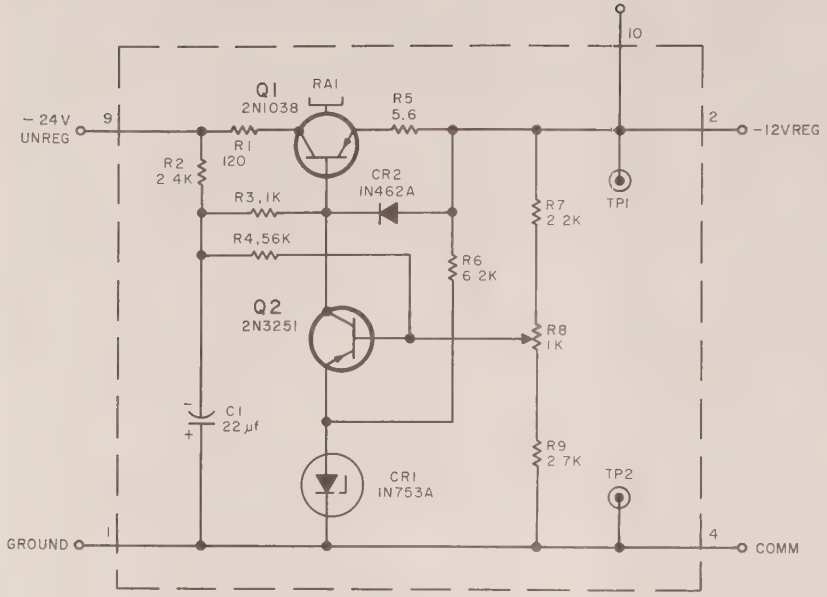
REF DESIG PREFIX A3 & A6 (SVT-30C ONLY)



NOTES
1 RESISTANCE IS MEASURED IN OHMS, ±5%, 1/4W
2 ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS
3 CW INDICATES CLOCKWISE ROTATION OF CONTROL KNOB
4 ⊘ INDICATES SCREWDRIVER ADJUSTMENT

Figure 6-3. Type 7963A Scan Limit Printed Circuit Assembly, Schematic Diagram

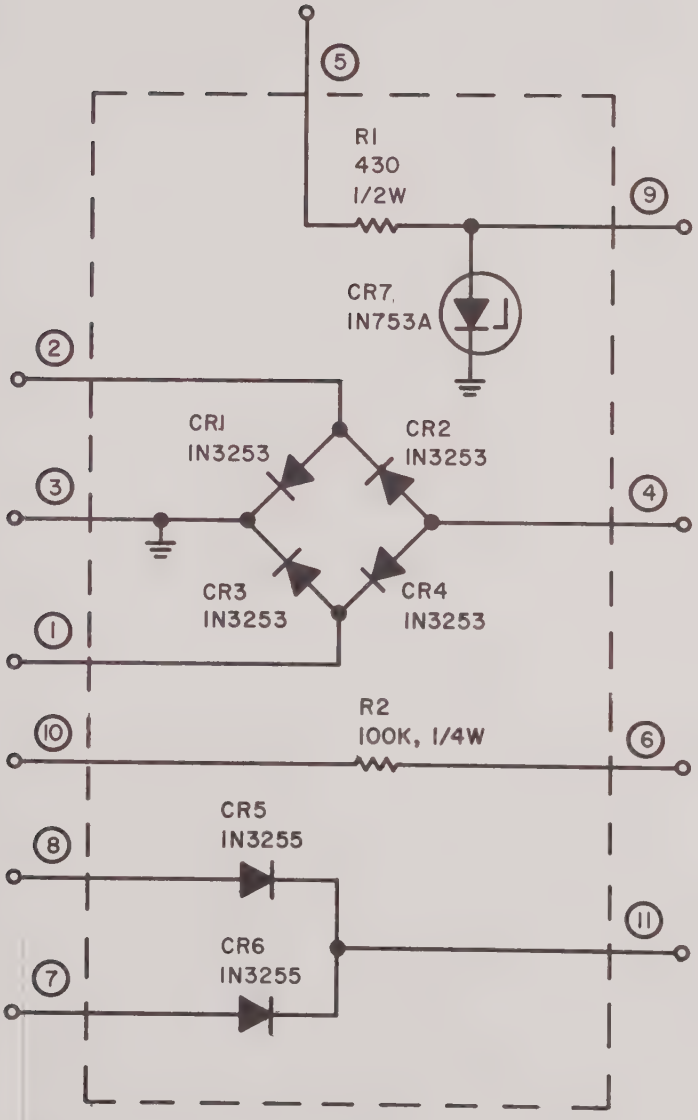
REF DESIG PREFIX A4



NOTES:
1. RESISTANCE IS MEASURED IN OHMS

Figure 6-4. Type 7655A -12V Power Supply Regulator, Schematic Diagram

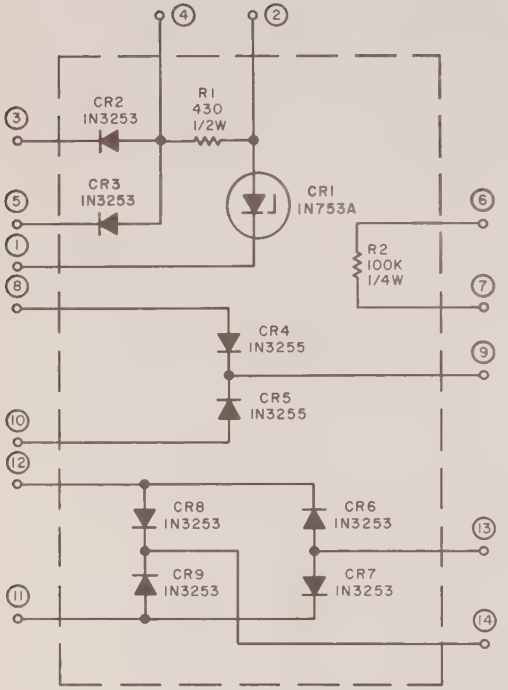
REF DESIG PREFIX A5 (VT-30C ONLY)



NOTES:
1. RESISTANCE IS MEASURED IN OHMS.
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS.

Figure 6-5. Type 7611 Power Supply, Schematic Diagram

REF DESIG PREFIX A5 (SVT-30C ONLY)



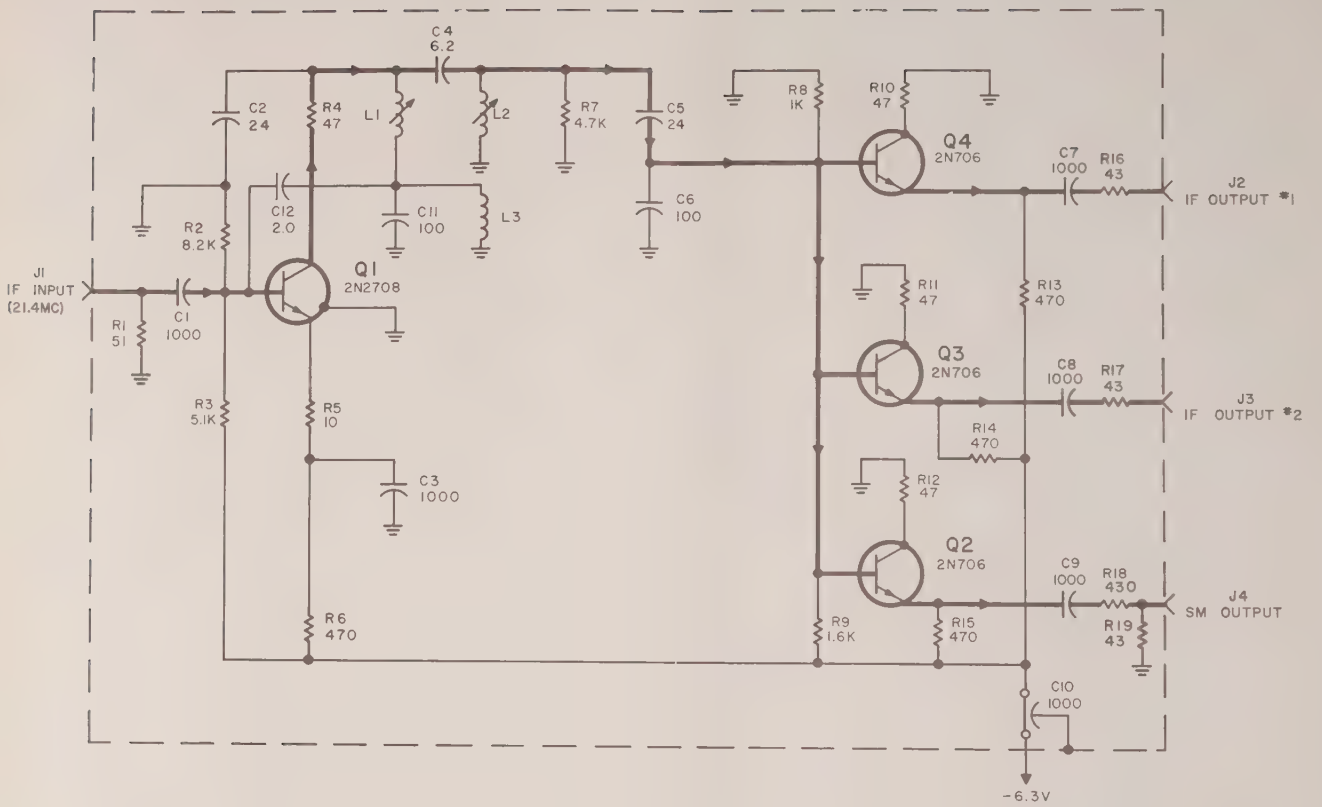
NOTES:
1. RESISTANCE IS MEASURED IN OHMS
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS

Figure 6-6. Type 7659 Power Supply Rectifier, Schematic Diagram

Figure 6-7

REF DESIG PREFIX A6 (VT-30C ONLY)

REF DESIG PREFIX A10 (SVT-30C ONLY)

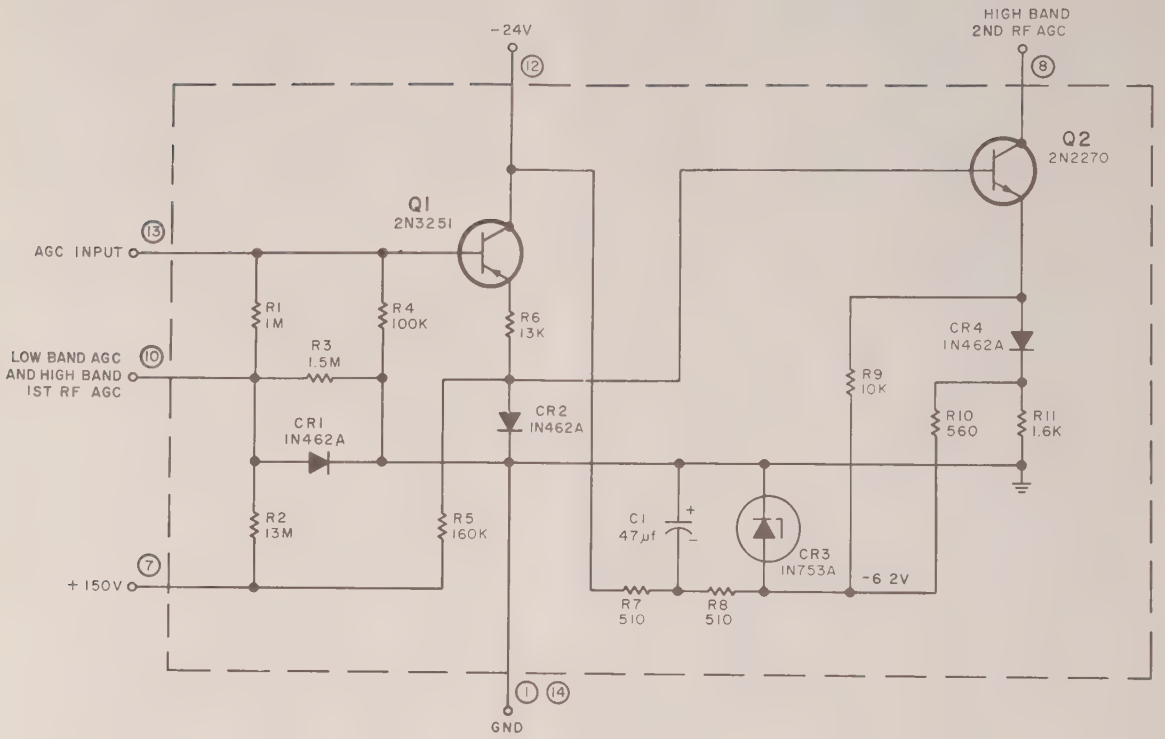


NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   A) RESISTANCE IS MEASURED IN OHMS ±5%, 1/4W.
   B) CAPACITANCE IS MEASURED IN pf.
2. HEAVY LINE DENOTES MAIN SIGNAL PATH.

Figure 6-7. Type 7913 Shaping Amplifier and Power Splitter, Schematic Diagram

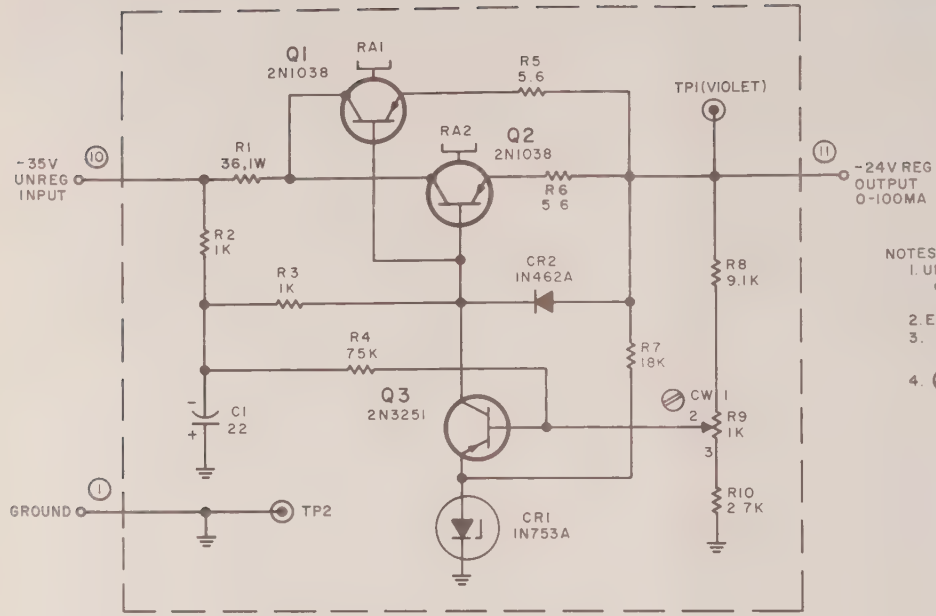
REF DESIG PREFIX A7



NOTES:
1. RESISTANCE IS MEASURED IN OHMS
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS

Figure 6-8. Type 7829 Delayed AGC Amplifier, Schematic Diagram

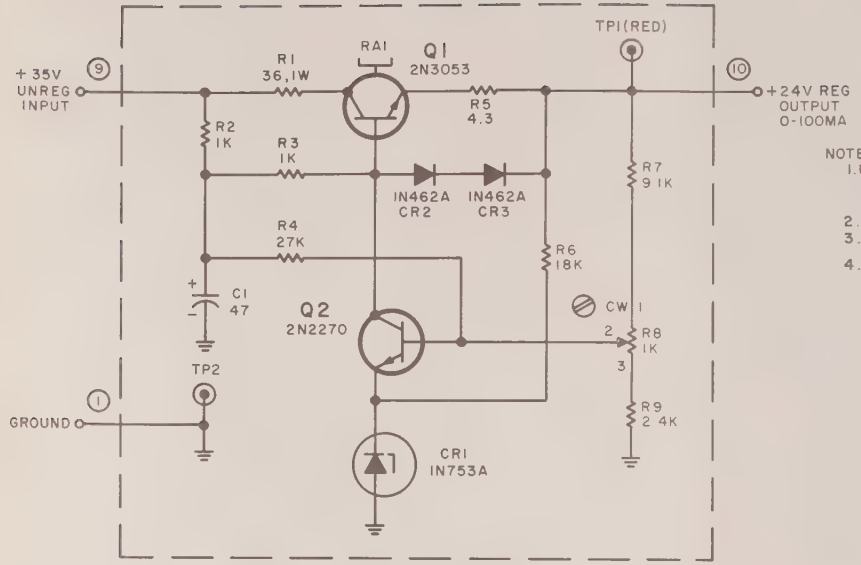
REF DESIG PREFIX A8 (SVT-30C ONLY)



NOTES
1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS MEASURED IN OHMS, ±5%, 1/4W
   b) CAPACITANCE IS MEASURED IN μf
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS
3. CW INDICATES CLOCKWISE ROTATION OF CONTROL KNOB
4. ⊘ INDICATES SCREWDRIVER ADJUSTMENT

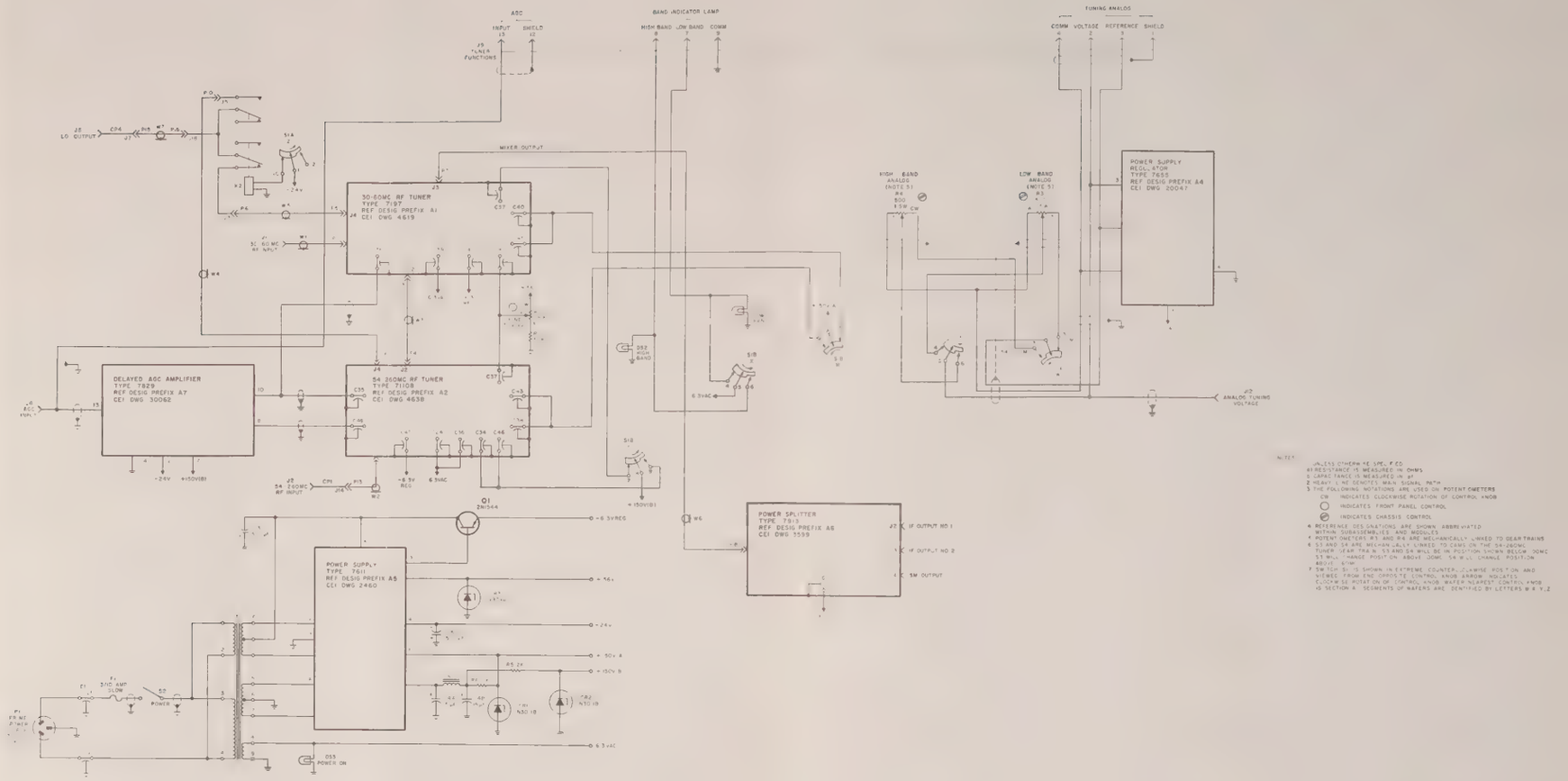
Figure 6-9. Type 7657 -24V Power Supply Regulator, Schematic Diagram

REF DESIG PREFIX A9 (SVT-30C ONLY)



NOTES:
1. UNLESS OTHERWISE SPECIFIED:
   a) RESISTANCE IS MEASURED IN OHMS, ±5%, 1/4W
   b) CAPACITANCE IS MEASURED IN μf
2. ENCIRCLED NUMBERS ARE MODULE PIN NUMBERS
3. CW INDICATES CLOCKWISE ROTATION OF CONTROL KNOB
4. ⊘ INDICATES SCREWDRIVER ADJUSTMENT

Figure 6-10. Type 7656 +24V Power Supply Regulator, Schematic Diagram


AGC
INPUT
SHIELD
J9
TUNER FUNCTIONS
BAND INDICATOR LAMP
HIGH BAND
LOW BAND
COMM
TUNING ANALOG
COMM
VOLTAGE
REFERENCE
SHIELD
J8
LO OUTPUT
MIXER OUTPUT
30-60MC RF TUNER
TYPE 7197
REF DESIG PREFIX A1
CEI DWG 4619
54-260MC RF TUNER
TYPE 7110B
REF DESIG PREFIX A2
CEI DWG 4638
DELAYED AGC AMPLIFIER
TYPE 7829
REF DESIG PREFIX A7
CEI DWG 30062
POWER SUPPLY
REGULATOR
TYPE 7655
REF DESIG PREFIX A4
CEI DWG 20047
HIGH BAND ANALOG (NOTE 5)
LOW BAND ANALOG (NOTE 5)
ANALOG TUNING VOLTAGE
POWER SUPPLY
TYPE 7611
REF DESIG PREFIX A5
CEI DWG 2460
POWER SPLITTER
TYPE 7813
REF DESIG PREFIX A6
CEI DWG 5599
IF OUTPUT NO 1
IF OUTPUT NO 2
SW OUTPUT
Q1
2N3544
+6.3VREG
+24v
+150v A
+150v B
6.3vAC
-24v
+150V(B)
-6.5V REG
6.3VAC
54-260MC RF INPUT
J10
J11
J12
J13
J14
J15
J16
J17
J18
J19
J20
J21
J22
J23
J24
J25
J26
J27
J28
J29
J30
J31
J32
J33
J34
J35
J36
J37
J38
J39
J40
J41
J42
J43
J44
J45
J46
J47
J48
J49

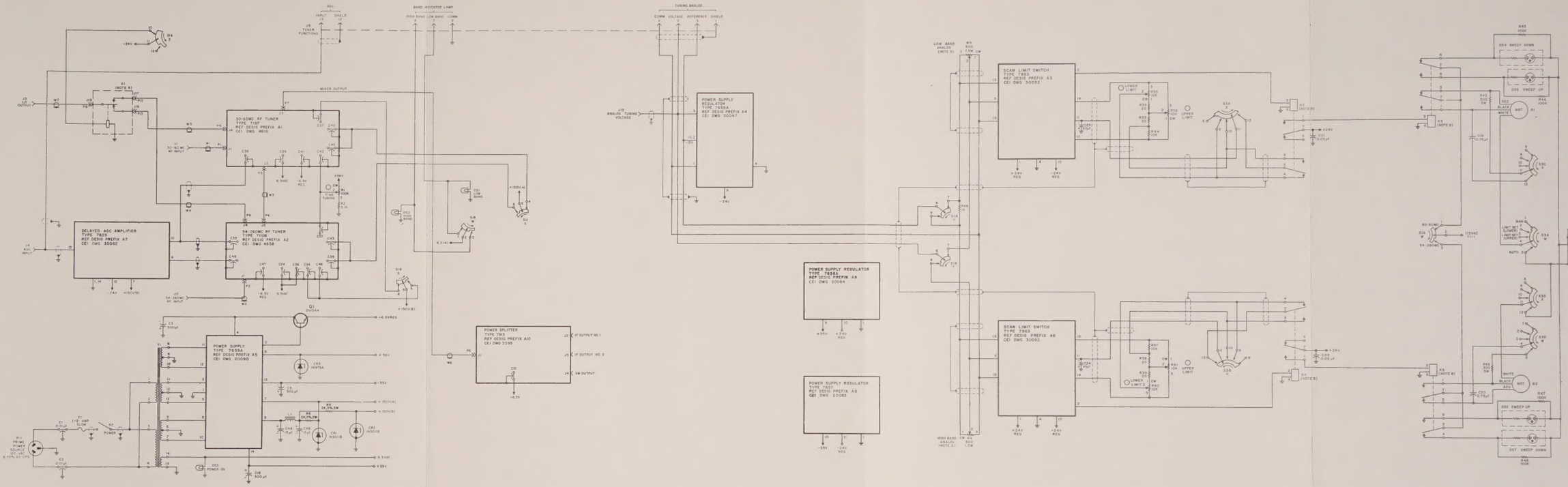


Figure 6-12. Type SVT-30C Tuner, Main Chassis Schematic Diagram